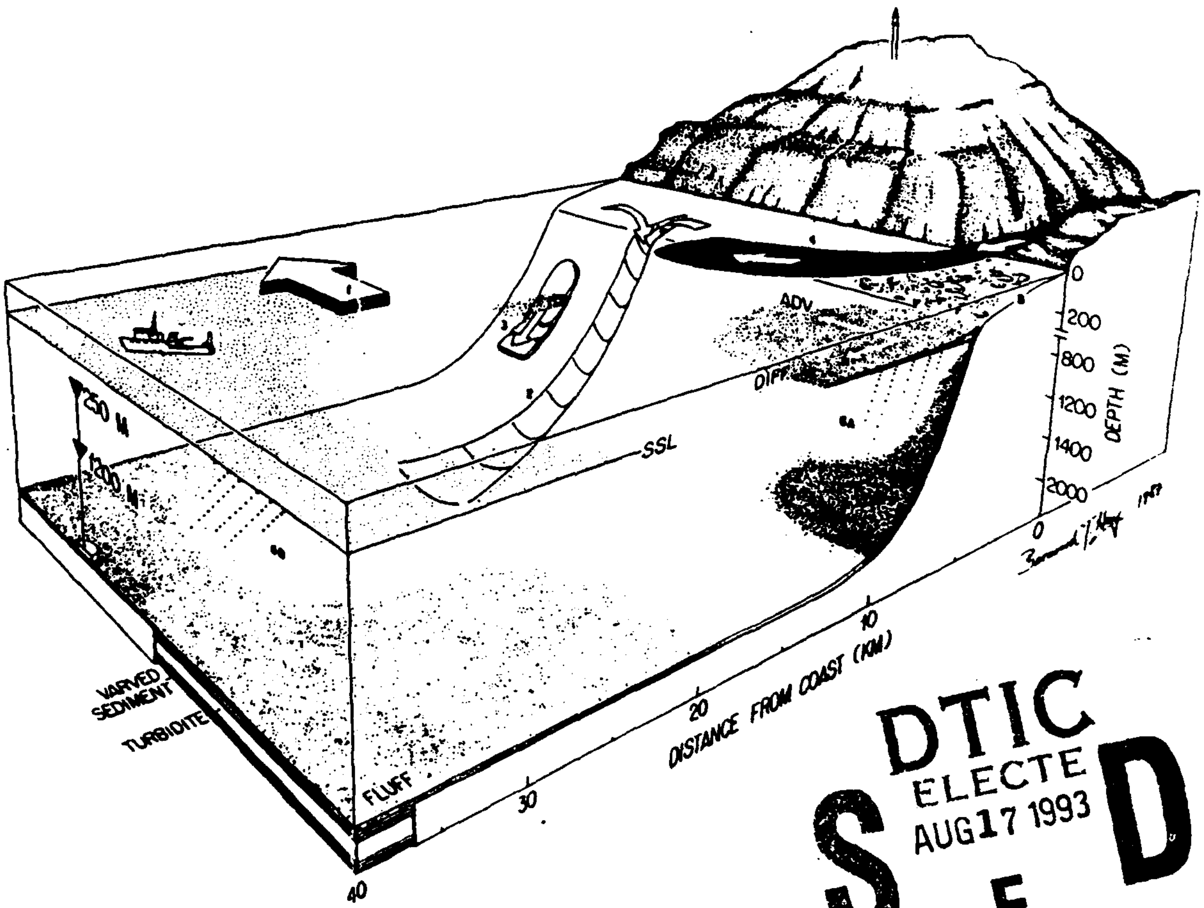
Black Sea Sedimentation Data File , Vol. 1, 1987

Particle Fluxes, South Central Black Sea: 1982 -1985



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Particle Fluxes, South Central Black Sea: 1982 -1985

(Black Sea Sedimentation Data File, Vol. 1)

by

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Bernward J. Hay, Amy Karowe

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May, 1987

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PARTICLE FLUXES,

SOUTH CENTRAL BLACK SEA

1982 - 1985

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Laboratory Analysis

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Abstract

Annual particle fluxes were measured by sediment traps deployed at a station about 40 km north of Amasra, Southern Black Sea, by an international team of oceanographers from Germany, Turkey, and the United States. This experiment continuously monitored oceanic particle flux for two and a half years from October 28, 1982 to April 6, 1985 at approximately two-week intervals at 250 m and 1200 m below the surface using 1.2 m^2 Mark 5-12 time-series sediment traps. The water depth at this station was about 2,200 m and both traps were situated within the anoxic layer of the Black Sea. The collected flux samples were analyzed at the Woods Hole Oceanographic Institution to document the basic sedimentary characteristics using a quarter of each sample split. In the first data file from this experiment, total mass, carbonate, noncombustible, combustible, opal (biogenic silica), organic carbon, and organic nitrogen fluxes data are presented in bar graphs and detailed tables, in unit samples covering a two-week period at each depth. The Black Sea Sedimentation Data File is intended to provide source data on particle fluxes from this unique ocean environment for further investigation and for planning advanced research programs.

Introduction

Nearly isolated from the influence of the world oceans, the Black Sea is the largest and most complete anoxic environment on earth. It is strongly characterized by the stratification of oxic and anoxic winter layers covering the entire area, providing a natural laboratory to study geochemical interactions between the boundaries.

Because of the absence of bioturbation, delicate laminae of sediment are generally well preserved in the abyssal bottom sediment, as a result of the establishment of anoxic conditions in the water column throughout the last 5,000 years (Degens and Stoffers, 1980; Degens at al., 1980).

Each laminae pair is presumed to represent an annual sedimentation cycle. Indeed, the Black Sea is one of the rare environments where flux and sediment can be coupled in a direct sense. The laminated sediments allow reconstruction of past oceanographic processes with the possible precision of annual events. Thus, an understanding of the geobiochemical and sedimentological processes in the modern anoxic environments is crucial.

The annual sequence of particle fluxes in the Black Sea was measured for the first time in a joint project between the Universität Hamburg, F.R. Germany, the Dokuz Eylül Üniversitesi, Izmir, Turkey, and the Woods Hole Oceanographic Institution (Izdar et al., 1984; Degens et al., 1984; Kempe, 1985; Honjo et al., 1987; Degens et al., eds., 1987).

The main objective of this project was to:

(1) Examine the annual variability of the particle flux and its major components in the Southern Black Sea.

(2) Identify the dominant mechanisms and processes and their interannual variability with regard to the supply of biogenic and lithogenic particles to the Black Sea.

The implications of such research are significant in two ways. First, they enhance our understanding of the major annual processes involved which link sediment supply, input from river detrital matter, and primary production induced particles with sediment dispersal mechanisms in near-shore marine environments. Second, these results contribute significantly to the study of ancient sediments in anoxic environments for the reconstruction of seasonal and longer-term sedimentation patterns in respective paleoceans.

Using automated, moored time-series sediment traps (Honjo and Doherty, 1987), the vertical flux in the southern Black Sea, at Station BS (Fig. 1), was collected at about 250 m and about 1,200 m continuously at approximately 2-week intervals for a period of 2 1/2 years (Table 1). Seasonal studies of the water column chemistry, suspended particles, and plankton succession were conducted twice a year in April and October of 1983, 1984, and in April only of 1985 (Degens et al., 1984) at this station.

From October 28, 1982 to April 6, 1985, we had five cruises on board R/V Koca Piri Reis, Dokuz Eylül Üniversitesi, over two and a half years, or 890 days inclusive of a hiatus of 39 days induced by cruise availability and mooring turnaround. The experiment, begun in October, 1982, was halted by an accident on April 9, 1985; the taut line of the mooring parted above the shallow sediment trap resulting in the equipment sinking to the bottom. The entire mooring including samples collected

from October 8, 1984 to April 4, 1985 were safely recovered by the R/V K. Piri Reis in June, 1986. The analytical results of those recovered samples are included in this data file under BS-5 samples (Table 1).

The Black Sea sediment trap experiment was restarted in June, 1986, in order to monitor the radionuclide fallout caused by the reactor accident at Chernobyl, Ukraine, USSR on April 26, 1986. The same research group was involved as in the BS experiments. The new mooring station, BSC, was located further west of the BS station. The BSC experiment was supported by the Office of Naval Research, Virginia, USA, and by the Ministry of Research and Technology, Germany (BMFT). This new series of sediment trap experiments is still ongoing, using the R/V Piri Reis as the experiment platform (Buesseler et al., 1987; Kempe et al., 1987). The results of laboratory analysis on the new series of experiments will be published in a separate data file.

Location and Period of Experiment

Station BS was located about 40 km north of Amasra, on the southern Black Sea coast (Fig. 1). The location of the trap mooring array changed by only about half a kilometer during the entire five series of deployments (Table 1). The coastal topography in the Amasra area is mainly formed by east-west striking transform faults. Thus the shoreline is bordered by rugged cliffs and a narrow marine shelf. The slope near Amasra is particularly steep. Between 100m and 2,000m the average slope angle is about 6° (Ross et al., 1974). There is a rather abrupt transition between the steep slope and the relatively flat Euxine Abyssal Plain, which is between 2,000 and 2,200 m deep (Fig. 1). The sediment traps were moored 15 km from the base of the slope at a water depth of approximately 2,200 m (Table 1).

The BS station near Amasra was selected because of the availability of deep Euxine Basin water within radar fixing range. Two radar transponders were placed on top of mosque minarets, located about 200 m above sea level, to mark the BS station with a triangular fix with absolute precision.

The detrital sedimentation at the BS station was more strongly influenced by coastal effects than by offshore activities (Honjo, Hay et al., 1987). Also, primary production was possibly more enhanced near the coast than in the central Black Sea. Therefore, the BS station may not represent the entire Black Sea in terms of particle sedimentation. However, the water column chemistry at this station was identical to that observed at a number of stations in the central area, described by Brewer and Spencer (1974). The depth of the anaerobic interface was approximately 180 meters and stratificaton was stable during the bi-annual geochemical profiles of the water column made in May and October, 1982 to 1985 (Table 1; Ittekkot et al., 1984; Degens et al., 1984; Kempe, 1985).

We regard the location of the BS station as an excellent one to understand the relationship between water geochemistry and particles. However, future flux investigations at a more central station, particularly near the Danube cone, are warranted to reach our long term objectives.

Sediment Traps and Mooring Array

The mooring array with PARFLUX Mark 5 time-series sediment traps (Fig. 2) deployed at the BS-1 station was funded for the University of Hamburg researchers through the Bundesministenium für Forschung und Technologie (BMFT) (E.T. Degens, Principal Investigator). The array height was approximately 2,022 m and was supported by a total of 1,650 lbs. (1,000 kg) of buoyancy by thirty three 17" glass spheres and tethered by an anchor (Fig. 3). The topmost floatation was usually about 210 m deep. Thus, the entire array was submerged in the anaerobic water layer. The aim of the experiment was to gain long-term flux records with high time-series resolution (Honjo, 1984).

Two time-series sediment traps, PARFLUX Mark 5-12 (Honjo and Doherty, 1987) each with a 1.2 m^2 opening and capable of continuously collecting 12-interval samples (Fig. 2), were moored in a vertical array at 275 m (s = 34 m) and 1,184 m (s = 50 m) (refered to in this data file as 250 m and 1,200 m). The sampling intervals varied between 11.33 and 15.33 days (Table 1). Sampling intervals in the 250 m and 1,200 m traps on the same array were identical and the opening/closing time was closely synchronized between the two depths (within a few minutes). Despite the fact that the Mark 5 sediment traps used during the 1982 to 1985 experiments were near prototype status compared to the traps described in Honjo and Doherty (1987), they worked satisfactorily. However, the shallow trap during the BS-4 experiment (April 19 to October 4, 1984) collected an unusually small mass flux although the rotating sampler mechanism functioned normally. We suspect that this trap was deployed in a tilted position because of an accidental snarling of the taut line around it. Caution must be taken when using the data from this particular experiment.

The corrosive nature of the H_2S-rich deeper water required special engineering consideration of the sediment trap and mooring system (a) to prevent excessive fatigue and corrosion, and (b) to avoid contamination of the particle samples in the traps from products of reaction between H_2S and the metalic components of the mooring array. During the first deployment, BS-1, zinc sulphide particles which formed on the chain shots, shackles, and other hardware located over both traps (Fig. 3), fell into the cones and mixed in with the sample material, particularly in the last few cups. This contamination is within sample splitting error with respect to total mass; however, it made it impossible to access the metalic fluxes collected during this period. After learning

from this experience, we exchanged the normal galvanized carbon steel components for type 316 stainless steel. Those parts which could not be exchanged, we coated with polyurethane compounds for protection against corrosion and precipitation. The 316 stainless steel and titanium (applied to critical sediment trap hardware components) withstood this environment very well for two and one-half years of deployment, and gave the least amount of contamination.

The aluminum alloy (6061-T6) without anodizing used mainly for the sediment trap frames and the anodized pressure chamber used for the electronics were generally in good condition; however, all aluminum parts were sporadically pitted after about one year of deployment, but not enough to matter to the experiment. A graphyte mixed epoxy coating over anodized aluminum was effective in preventing corrosion of aluminum alloy, but it tended to accelerate pitting from scratch marks on the coating which penetrated into the metal.

We used MacWhyte torque-compensated 3/16 steel wire with a thick polyethylene jacket (an off-the-shelf product) with 902 and 990 m long shots for the major taut lines (Fig. 3). The terminations were covered by polypropylene boots to prevent water seepage and entanglement. We have used the same mooring wire throughout the 5 experiments, replenishing the shots wherever seepage through the jacket was suspected. However, such prolonged use of the steel taut line caused the parting incident after two and a half years. The taut line was replaced by 3/16 jacketed Kevlar line when the experiment was restarted in June, 1986.

We used a single Benthos 865A acoustic release. This particular release worked flawlessly throughout two and a half years of experiment. As mentioned before, buoyancy was accidentally lost during the recovery of BS-5, and the release rested for an extra 7 months on the 2,232 m bottom. In June, 1986, when the R/V K. Piri Reis revisited the site, the release responded to the surface ship; thus the precise position was available for successful recovery by grapling the partially horizontal taut line. We have not found any sign of corrosion throughout the surface of the release pressure chamber which was made of 17-4-PH high-strength stainless steel in over three years of total submergence. The 10-20 carbon steel sacrificing anode on the release collected significant precipitate of sulphur iron compounds during the first experiment. The stainless steel pressure chamber was deployed without a sacrificing anode during the rest of the experiment. Before deployment, the gap between the end plate and the cylinder of the pressure housing was completely filled with Dow Corning silicon grease in order to prevent O-ring exposure to the H_2S-rich water. The grease was unaffected by sea water and well protected the gap and O-rings. We used the same original O-rings (new sulphur-containing Viton®) throughout the BS experiment.

The mooring array and samples were recovered every six months, from BS-1 through BS-5, onboard R/V K. Piri Reis. Dr. Tosun Konuk, Dokuz Eylül Üniversitesi, was the Chief Scientist during all deployment and recovery cruises. Each array was redeployed a few days after recovery, immediately after reconditioning on board ship and/or during a port stop in Amasra.

Samples and Laboratory Analysis

Time-series samples were collected from May 18, 1983 to April 15, 1984 and from October 8, 1984 to April 6, 1985 in the 250 m trap, and from October 28, 1982 to October 4, 1984 in the 1,200 m trap. One hundred and eighteen samples, each representing about 2 weeks of deployment, were obtained and analyzed for this file (Table 1). Samples were unpoisoned except for the samples in the 250 m trap from October 8, 1984 to April 6, 1985, which were poisoned with 5% formaldehyde. Since both the shallow and deep traps were deployed in a completely anoxic layer, no "swimmer" problem was expected. The high pH and Eh values of the three samples between March 12, 1982 and May 1, 1982 (BS-1, #10-12) indicate that the water in the sampling cups was exchanged with surface water (Ittekkot et al., 1984) and results from these three samples should be used with caution.

Each sample in its container was sealed under nitrogen atmosphere as soon as the samples were brought on board. Then, they were shipped to Woods Hole Oceanographic Institution under refrigeration retained under nitrogen. During processing in the shore laboratory, samples were exposed to the air. Samples were first sieved through a Nylon mesh with 1 mm openings. The material which passed through the mesh was then split into 4 equal aliquots using a precision wet splitter (Honjo, 1980). The Woods Hole Oceanographic Institution group received a quarter aliquot. They were analyzed following the procedures illustrated in the flow chart, Fig. 4.

One 1/16 aliquot of the <1 mm fraction was filtered with a preweighed 0.45μm Nuclepore® filter and rinsed with distilled water three times. After drying for 24 hours at 50°C the dry weight was determined from which the total flux could be calculated. For the determination of the total flux and major flux components described below for the >1 mm fraction, the same respective procedures were carried out as for the <1 mm fraction. For the determination of the carbonate flux the dried sample was immersed in 10% acetic acid and ultrasonically dispersed. After 24 hours the sample was filtered, rinsed with distilled water, dried, and reweighed. The carbonate flux was computed from the weight loss after decalcification. A part of the decalcified, dried sample was placed on a platinum boat and combusted for 4 hours at 500°C. The ash was weighed on a Kahn 24 electronic balance to determine combustible/noncombustible components. The organic carbon and organic nitrogen

contents in the decalcified sample was determined by a Hewlett-Packard® elemental analyzer. The hydrogen value produced by the elemental analyzer is not well understood but is listed for reference.

The biogenic silica flux was obtained from about 5 mg of the decalcified sample material using a method modified after Eggiman et al. (1980) and Strickland and Parsons (1968). Eggiman et al. (1980) found that sediments with a biogenic silica/clay ratio larger than 1.0 can be analyzed by a single leach with 2M Na_2CO_3 solution without correction for silica that also had been leached from the clays. Determination of the reactive silicate depends on the production of a silicomolybdate complex forming between silica, leached by the Na_2CO_3 into solution, and ammonium-molybdate which was added subsequently. A reducing solution containing metol and oxalic acid was then added, which reduced the silicomolybdate complex to give a blue reduction compound (Strickland and Parsons, 1968). The absorbance of this compound was measured with a spectrophotometer to yield a ppm value of biogenic silica in the sample, from which the biogenic silica flux subsequently was computed.

The lithogenic flux was determined indirectly. About 5 mg of decalcified sample was combusted at 500°C in a muffle furnace to remove the organic material. From the weight of the remaining material (ash) the noncombustible flux was determined. The lithogenic flux was then computed by subtracting the biogenic silica flux from the noncombustible flux, under the assumption that the noncombustible flux was a sum of biogenic silica and terriginous detritus (clay, quartz, and feldspar with minor igneous components).

The samples from the BS-5 were sieved once using a 1 mm mesh sieve. The fluxes of >1 m and <1 m particles were given for total flux, carbonate, noncombustible and combustible. No size frationing was done on the opal, lithogenic, organic carbon, and nitrogen fluxes. The analysis of phosphorous and sulphur in the trap samples has not been completed. In the second volume of this data file, we will publish the flus of P and S among other analytical information available at the time of publication.

Results

In this data file it is not our intention to elaborate our scientific findings but to present the obtained flux data gathered during the 1982-1985 experiment in a convenient form as source material for further research. From June 23 to 28, 1986, an international conference entitled "Particle Flux in the Ocean" was held at Dokuz Eylül Üniversitesi, Izmir, Turkey. A number of papers were read based upon the data sets which are published in this file. A conference publication with the same title as the meeting will be off the presses soon via the Hamburg University Press (Degens, Izdar, and Honjo, co-editors, 1987, in press). The following is

a summary of findings given in previous publications, particularly in Honjo, Hay, et al., 1987 (in press).

Three distinct phases can be distinguished in the annual regime of particle fluxes in the Black Sea (Fig. 4). These phases prevail from June to October (Phase I), November to January (Phase II), and February to May (Phase III), with a variation of a few weeks on either side. These phases are repeated annually despite variations in the absolute flux. For reasons of simplicity the analytical results will be discussed in this paper in terms of these three phases as time frames.

Over the two and a half year time period the particle flux in the Black Sea varied significantly within each phase, in the 250 m as well as in the 1,200 m deep trap. Typically, the total flux was larger in the 1,200 m trap than in the 250 m trap, with the exception of Phase II between 1983 and 1984. The largest flux occurred during this phase between Nov 14 and 30, 1983 with 485 mg m^{-2} day^{-1}. Total flux averages per deployment period are given in Table 2.

There also exists considerable differences in the total flux between the 250 m and 1,200 m trap for any given individual sampling interval. The largest difference occurs in the spring season (Phase III). In Phases I and II the difference between the two traps is more consistent. The differences between the two traps indicate the significance of lateral transport and patchiness. Nevertheless, the relative composition of major chemical and biological components within each sample cup was similar. Therefore the flux of the major particulate components from both traps will be discussed simultaneously below.

The carbonate flux clearly was largest in Phase II, with an average contribution to the total flux of 37% in the 250 m trap and 47% in the 1,200m trap. The contribution of carbonate was relatively small in Phases I (23% in both traps) and III (21% and 16% in the 250 m and 1,200 m traps, respectively). On the other hand, the flux of biogenic silica was largest in Phase III, reaching 21% of the total flux in the 1,200 m trap. In Phase III in 1983 this peak in the 1,200 m trap extended into the subsequent Phase I, 1983. In the 250 m trap the maximum content of biogenic silica during Phase III was not nearly as high: only 5.8%, which may have been caused by more intense dissolution in the 250 m trap due to higher undersaturation of silica at the shallower water depth. In Phases I and II the silica concentration in both traps was around 3 and 5%. The organic carbon flux was largest in Phase I, reaching values of over 40 mg m^{-2} day^{-1}, and significantly lower values of only up to 16 mg m^{-2} day^{-1} in Phases II and III (with the exception of sample BS1, #1, 1,200m trap). The organic carbon flux was about 20% of the total flux for Phase I in both traps and between 5% and 8% for Phases II and III.

The lithogenic flux was largest in Phases II and III, reaching up to 346 mg m^{-2} day^{-1} in the 250 m trap. Periods of high lithogenic flux

typically occurred as sharp isolated peaks. A single most pronounced peak was observed in the 250 m trap in the period between November 14 and 30, 1983. Throughout Phase I, the lithogenic flux was comparatively small; it was less than 50 mg m^{-2} day^{-1} except for the peak between August 16 and 28, 1983, when the flux reached 160 mg m^{-2} day^{-1}.

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We are deeply indebted to the officers and crews of the R/V Koca Piri Reis whose high level of support in the deployment and recovery of the large and complex mooring array was critical to the success of the data collection. This study would not be possible without dedicated engineering support by Ken Doherty, Woods Hole Oceanographic Institution, for the mooring system and automated sediment traps designed for the special and severe ocean chemical environment. We also thank Emily Evans for her capable assistance in editing this file. The analytical study of the samples collected during 1982 to 1985 published in this file was supported by the National Science Foundation, Washington, D.C., USA under OCE86-17106.

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Table 1: Summary of deployment schedules of sediment trap mooring array at station BS, deployed by R/V Koca Piri Reis of the Dokuz Eylül Üniversitesi of Izmir, Turkey, Dr. T. Konuk, Chief Scientist. This table summarizes the water depths, trap locations in the water column, and quality of the samples for all sediment trap array deployments during the 1982-1985 experiments.

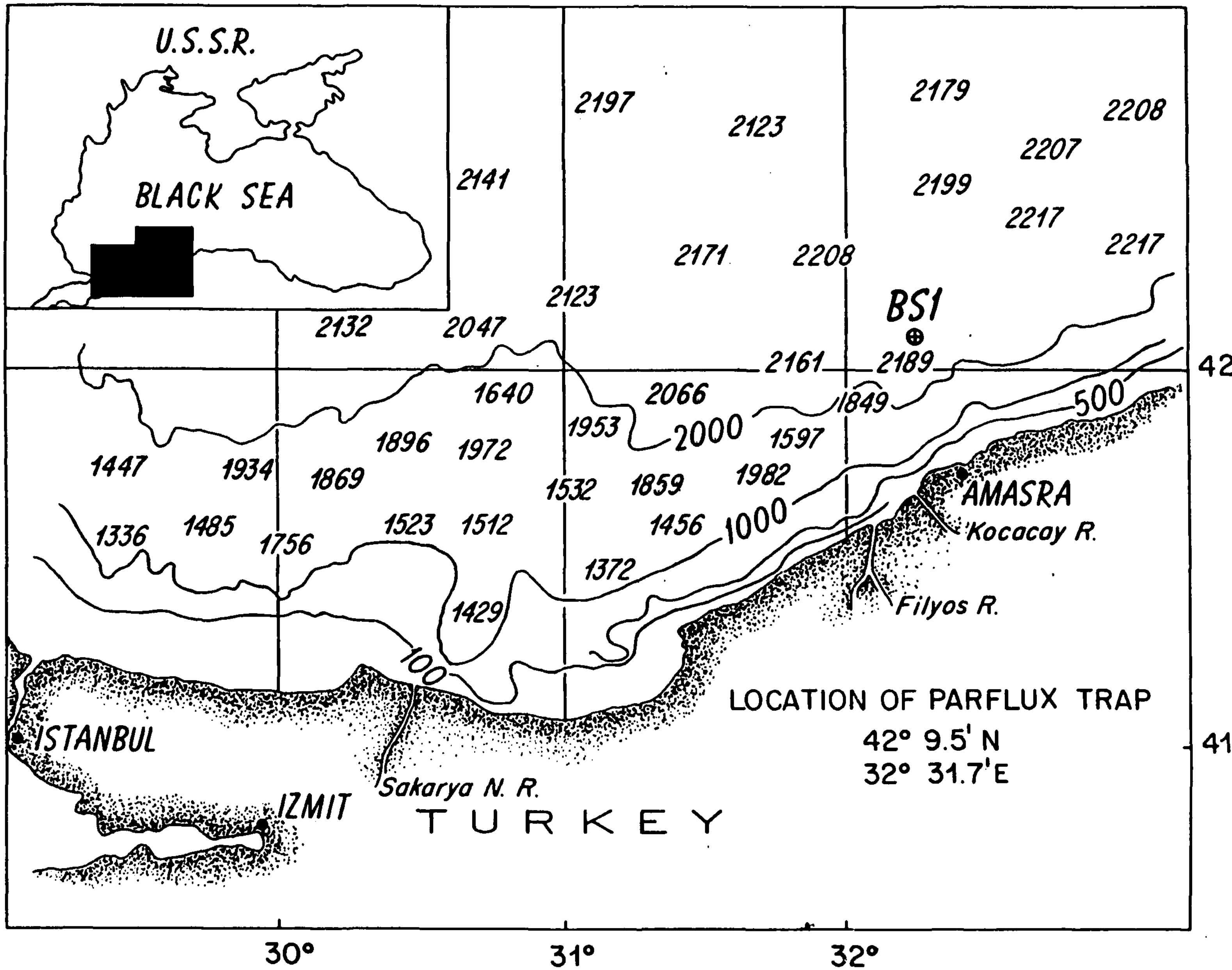
	BS1	BS2	BS3	BS4	BS5
Location:					
Lat.	42° 9.5'N	42° 11.54'N	42° 11.9'N	42° 11.9'N	42° 15.3'N
Long.	32° 31.7'E	32° 31.77'E	32° 38.2'E	32° 36.8'E	32° 37.8'E
Deployment time:					
From	Oct/28/82	May/18/83	Oct/15/83	Apr/19/84	Oct/08/84
To	May/01/83	Oct/01/83	Apr/15/84	Oct/04/84	Apr/06/85
Trap model:					
250m	PARFLUX Mark 5-12 samplers				
1,200m					
Sampling interval (days)	15	11.33	15.33	14	15
Trap depths (m):					
250m	-	307	240	245	278
1,200m	1195	1249	1158	1133	1136
Anchor depths (m):	2,232	2,175	2,189	2,180	2,232
Sample fixation:	-	-	-	-	Formaldehyde

Table 2. Total flux averages per deployment period.

		Deployment Period	Avg. Flux $mg\ m^{-2} day$	Minimum	Maximum
Shallow Trap (about 250 m)					
BS	2	May 19, 83 - Oct 01, 83	91.19	14.51	428.50
	3	Oct 15, 83 - Apr 15, 84	134.17	3.86	484.69
	4*	Apr 19, 84 - Oct 04, 84	3.76	0.92	5.66
	5	Oct 08, 84 - Apr 06, 85	104.75	2.41	283.90
Deep Trap (about 1,200 m)					
BS	1	Oct 28, 82 - Apr 11, 83	72.99	1.02	309.51
	2	May 18, 83 - Oct 01, 83	130.26	62.53	291.66
	3	Oct 15, 83 - Apr 15, 84	123.25	19.43	336.28
	4	Apr 19, 84 - Oct 04, 84	77.56	5.83	136.16
	5	Oct 08, 84 - Apr 06, 85	151.18	3.81	333.45

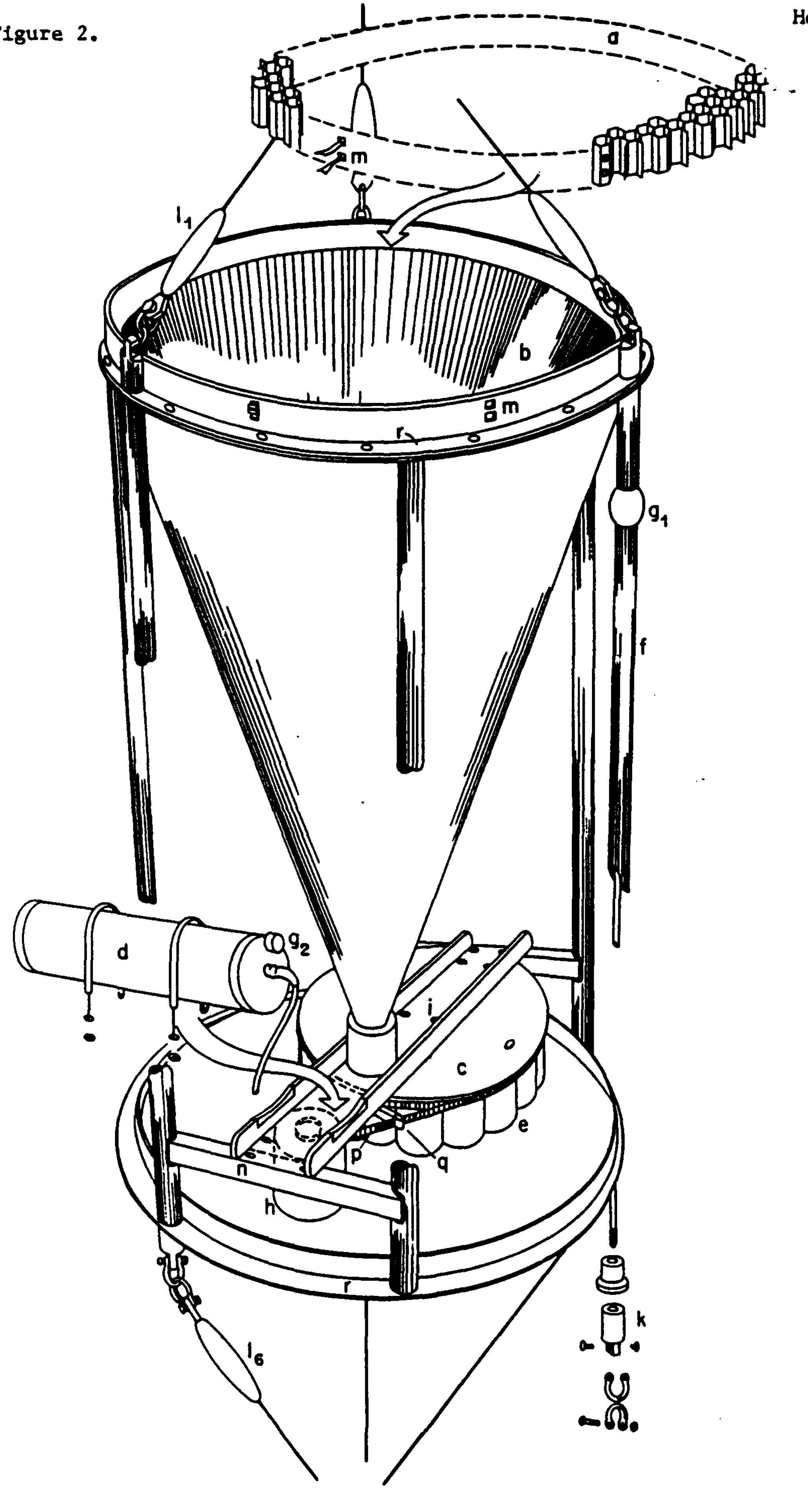
Each deployment consists of 12 sampling periods, ranging from 11.33 to 15.33 days per sampling interval.

* The BS-4 deployment might have been abnormal. Refer to the section, "Sediment Traps and Mooring Array" in the text, page 4.



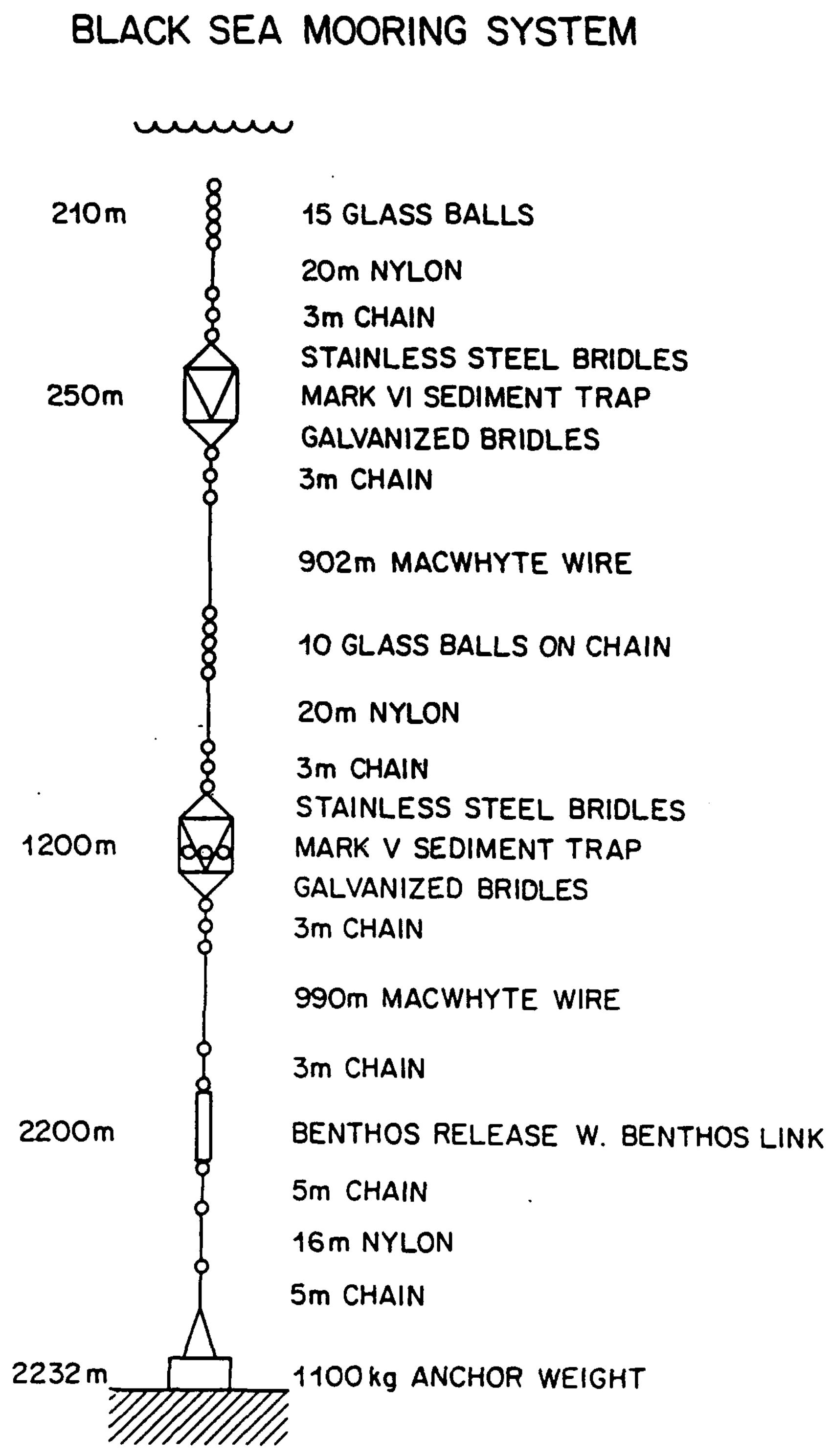
Location of the sediment trap mooring site in the Black Sea, 1982 to 1985 (station BS). The shortest distance to shore is approximately 40 km.

Figure 2.



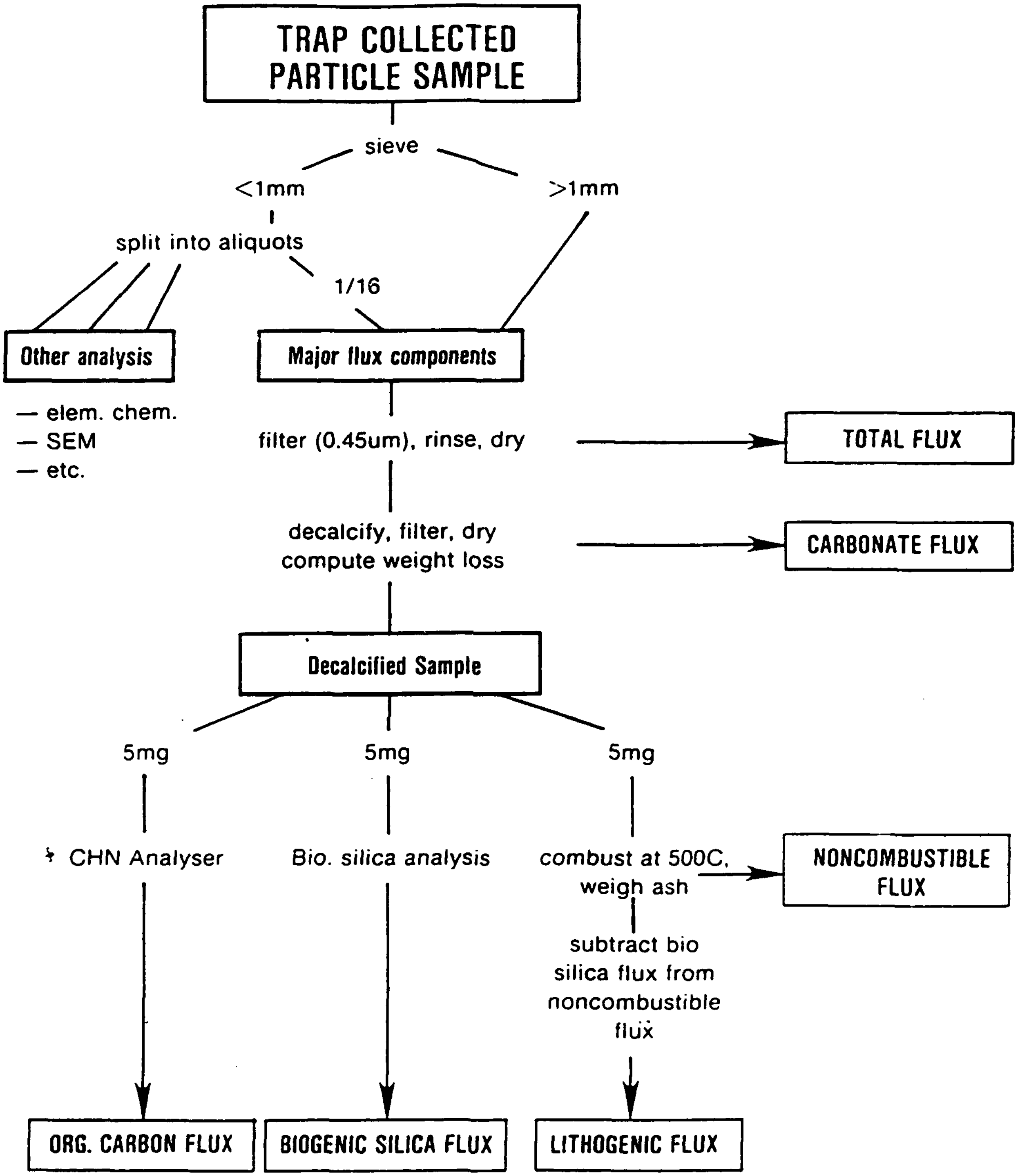
Mark 5-12 time-series sediment trap (from Honjo and Doherty, 1987).

Figure 3.



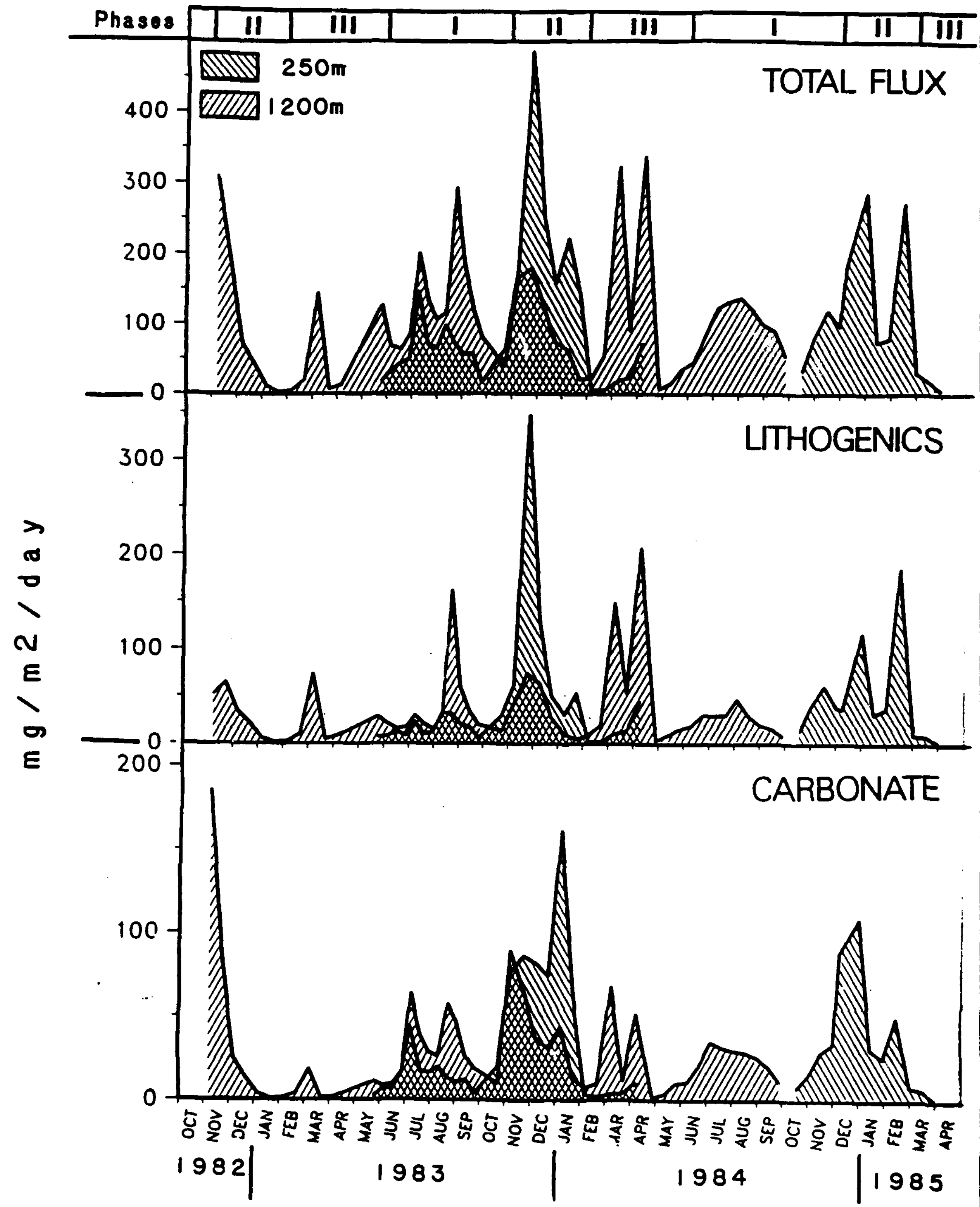
Schematic diagram of the sediment trap mooring array used in the deployment of two Mark 5 sediment traps at 250 m and 1,200 m on the abyssal plain in the Black Sea at station BS.

Figure 4.



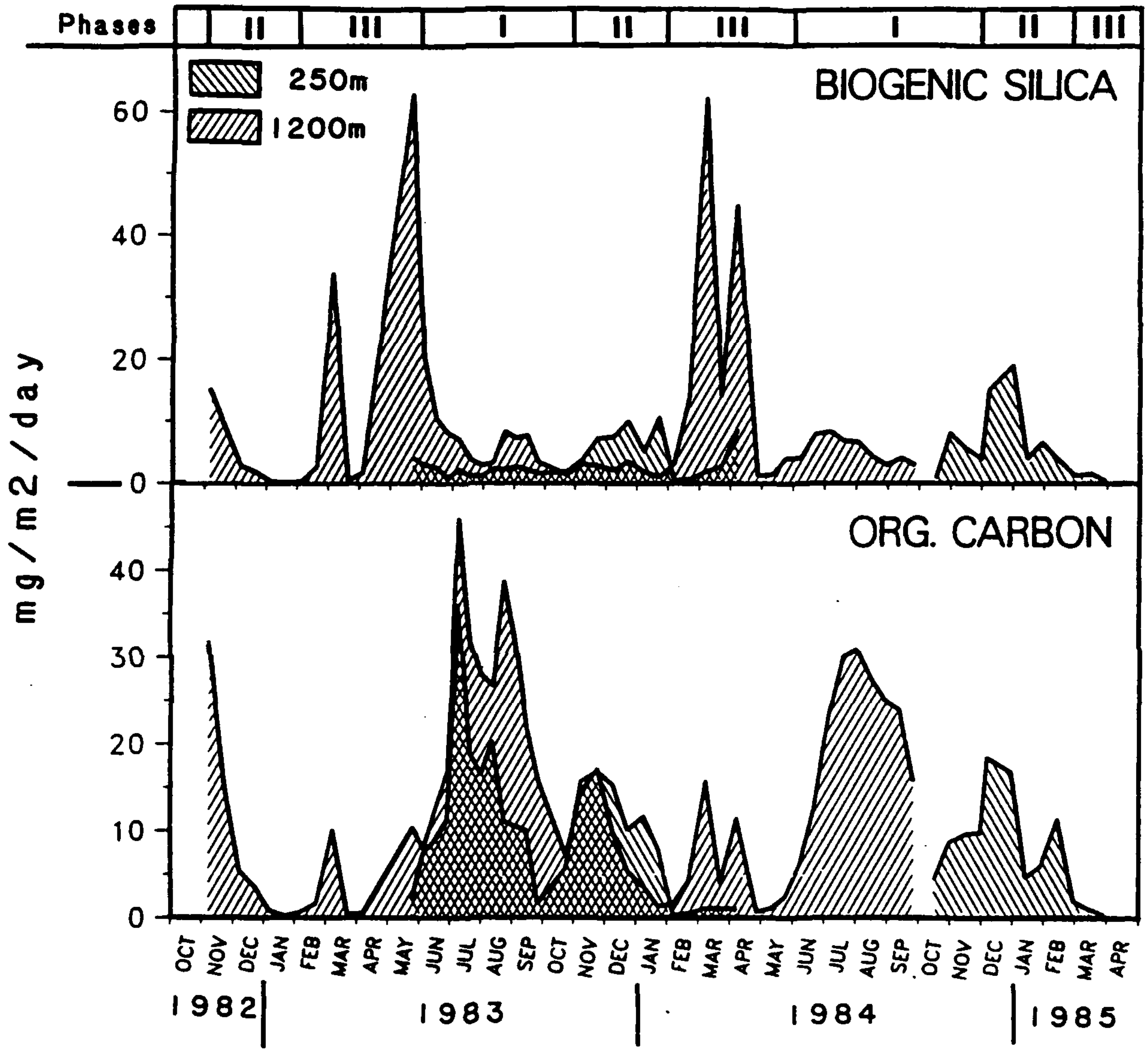
Schematic flow-diagram of the laboratory processing and analysis of the Black Sea sediment trap samples.

Figure 5a.



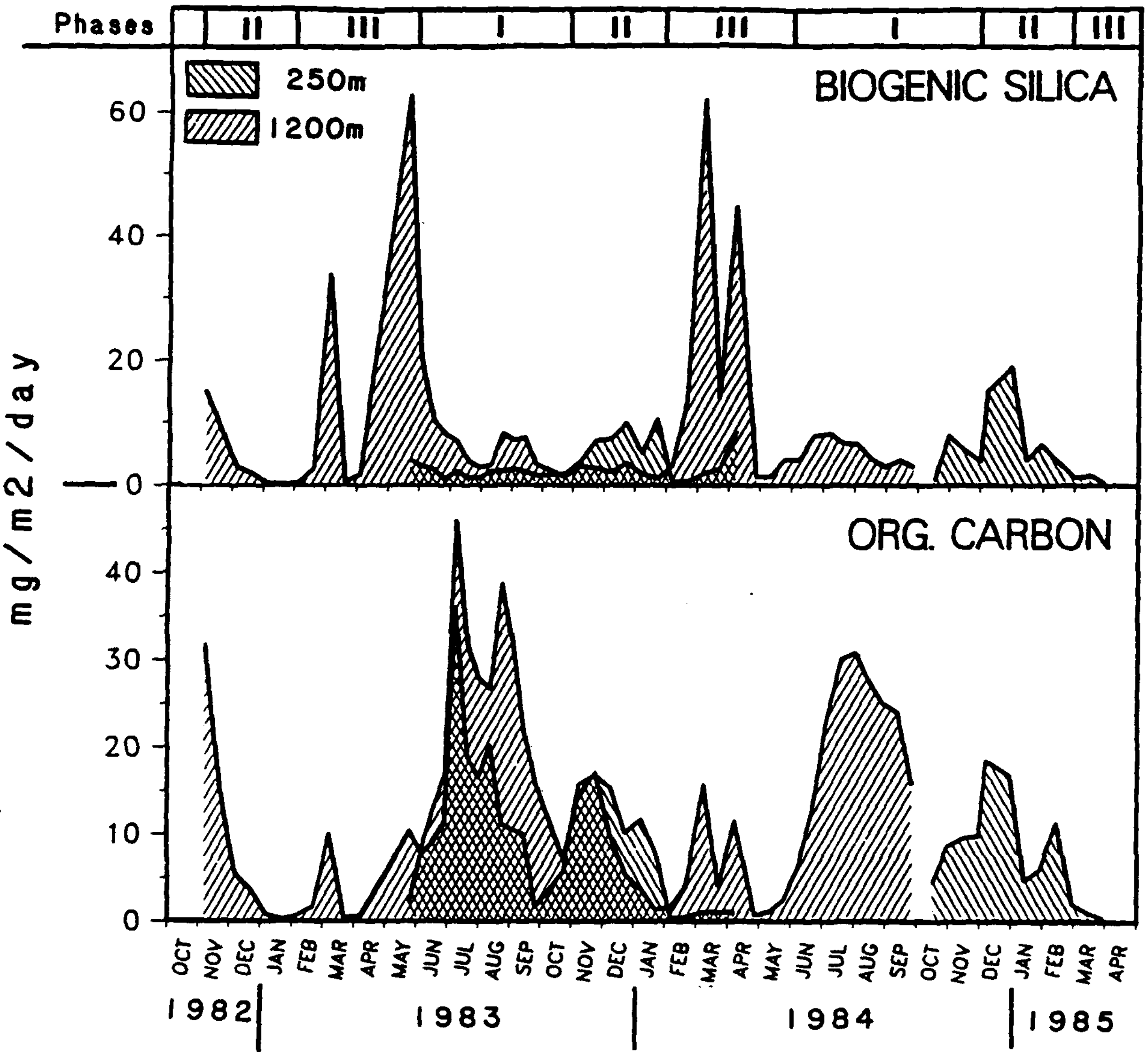
Time-series transition of total and major component fluxes compared between the 250 m and 1,200 m traps over the deployment period (October 28, 1982 to April 5, 1985; from Honjo, Hay, et al., 1987).

Figure 5b.



Phases
II
III
I
II
III
I
II
III
250m
1200m
BIOGENIC SILICA
ORG. CARBON
mg/m2/day
60
40
20
0
40
30
20
10
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
1982
1983
1984
1985

Figure 5c.



Phases
II
III
I
II
III
I
II
III
250m
1200m
BIOGENIC SILICA
ORG. CARBON
mg/m2/day
60
40
20
0
40
30
20
10
0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
1982
1983
1984
1985

Experiment BS-1

Flux at 1,195 m deep

October 28, 1982

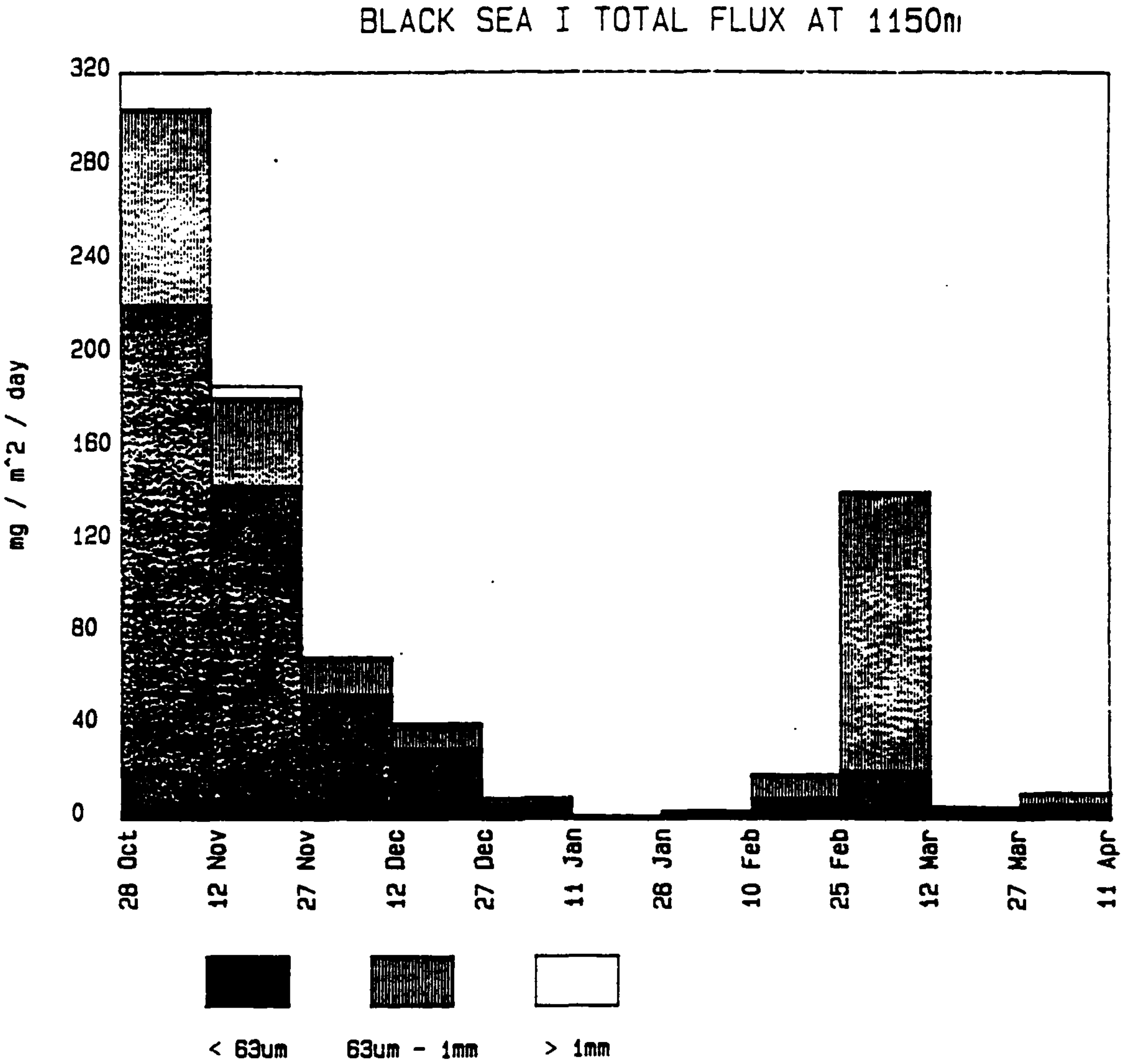
to

May 1, 1983

at

15 day intervals

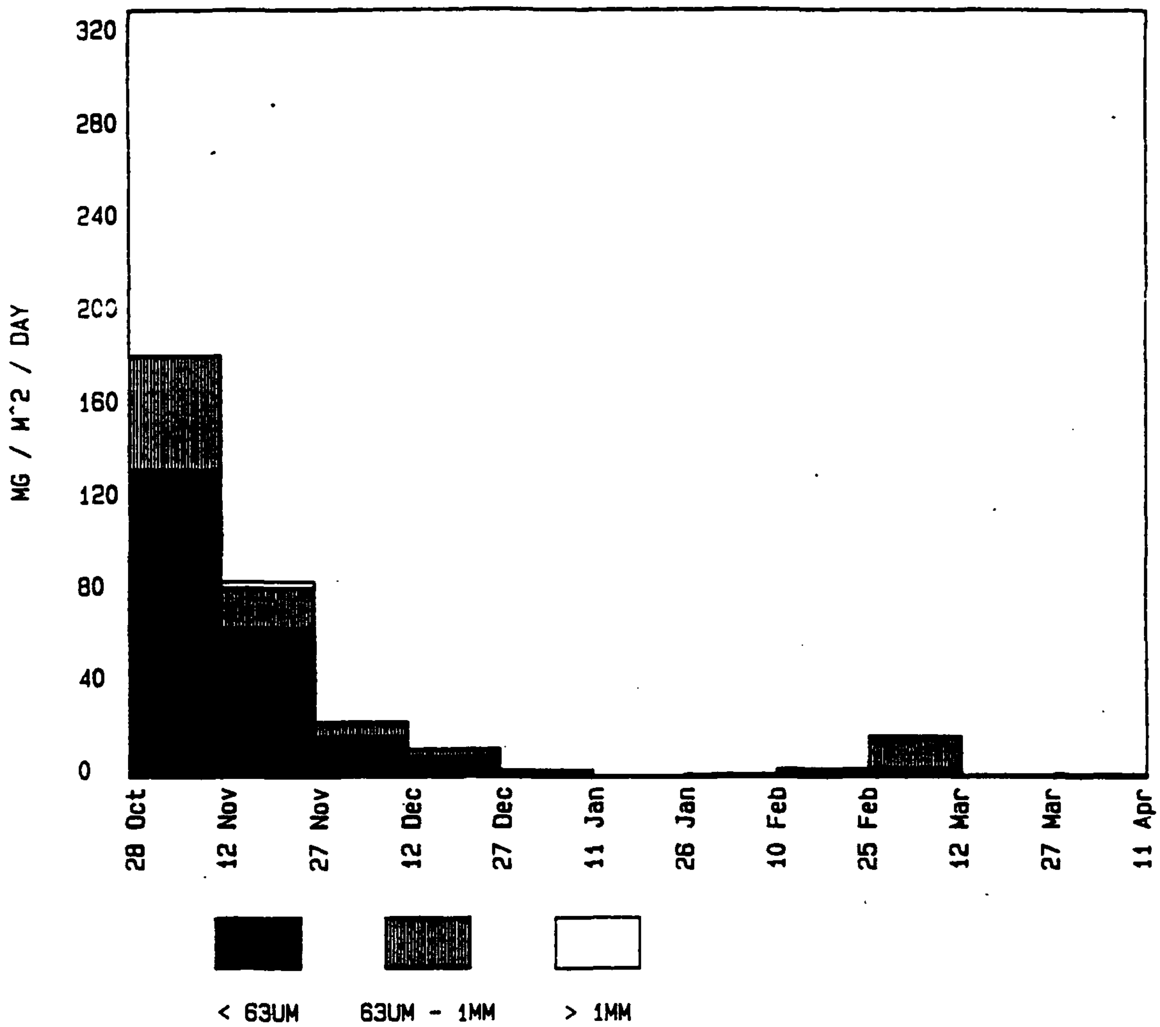
(Samples No. 10, 11, and 12 need caution)



Black Sea I 11 Cups Not poisoned; Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

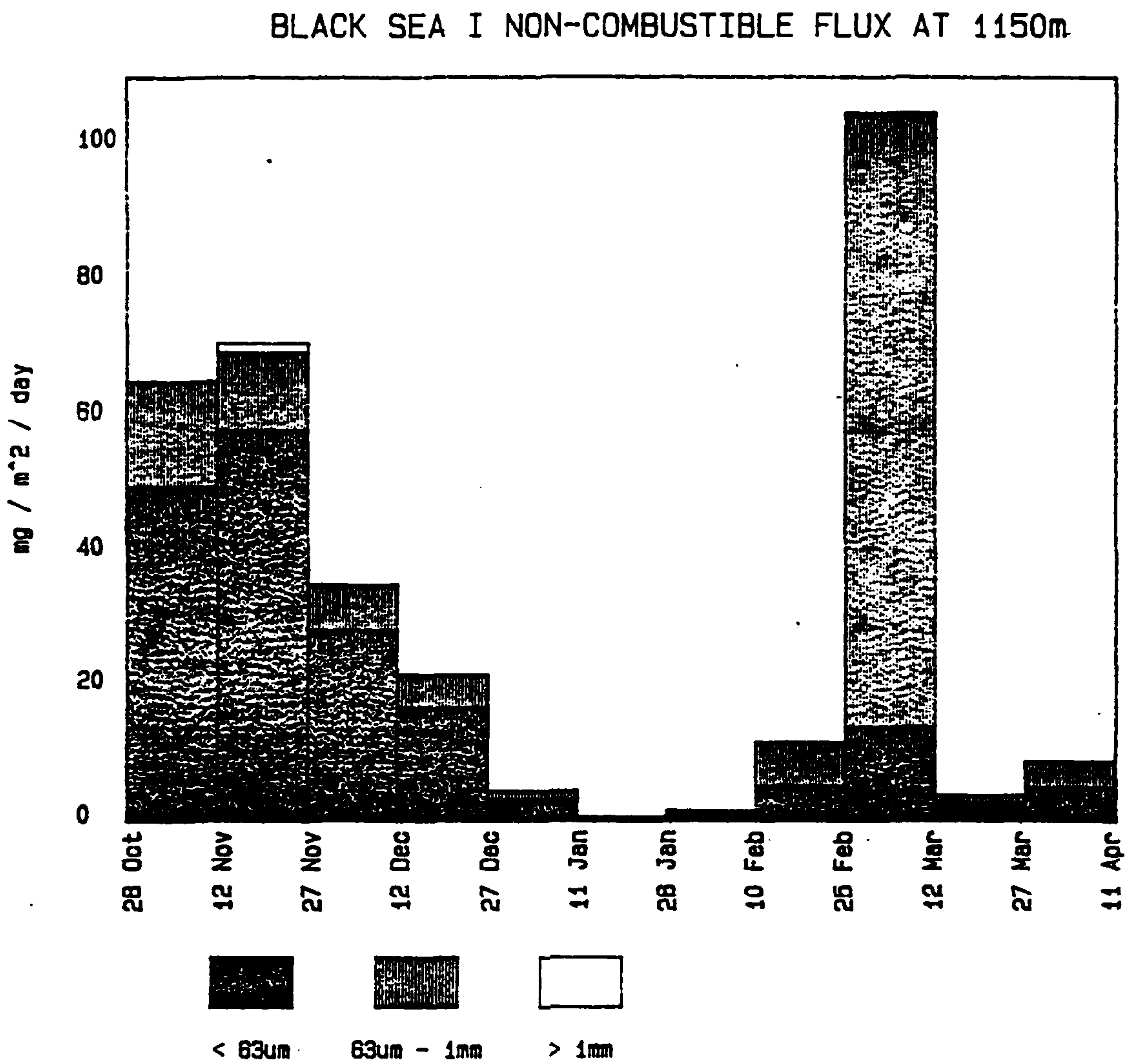
Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	72.60	224.69	27.22	84.24	.19	.58	100.00	309.51
2	77.14	146.06	20.17	38.19	2.69	5.09	100.00	189.34
3	76.42	54.17	22.29	15.80	1.28	.91	100.00	70.88
4	73.46	30.51	26.32	10.93	.20	.08	100.00	41.53
5	69.66	6.29	30.23	2.73	.00	.00	100.00	9.03
6	44.12	.45	56.86	.58	.00	.00	100.00	1.02
7	63.24	2.15	36.76	1.25	.00	.00	100.00	3.40
8	46.45	8.90	53.55	10.26	.00	.00	100.00	19.16
9	14.53	20.73	85.82	122.40	.00	.00	100.00	142.63
10	71.02	3.70	28.79	1.50	.00	.00	100.00	5.21
11	56.13	6.27	43.87	4.90	.00	.00	100.00	11.17

Black Sea I Carbonate Flux at 1150m



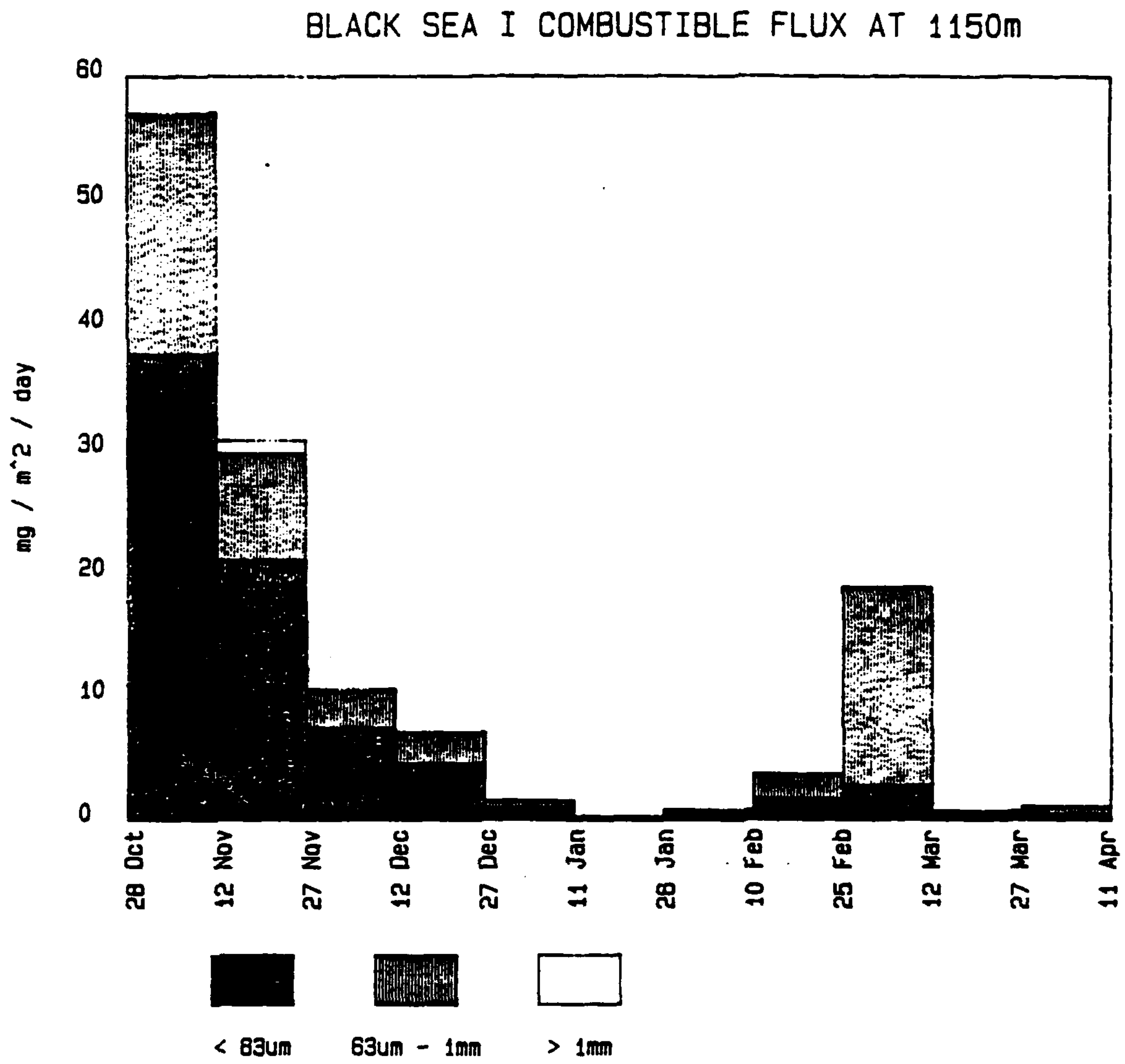
Black Sea I 11 Cups Not poisoned: Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
Carbonate Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	43.91	135.89	15.89	49.18	.09	.26	59.88	185.34
2	34.64	65.60	9.46	17.91	1.41	2.67	45.51	86.17
3	25.08	17.77	8.53	6.05	.58	.41	34.19	24.23
4	21.19	8.80	8.31	3.45	.07	.03	29.57	12.28
5	23.07	2.08	9.45	.85	.00	.00	32.52	2.94
6	11.36	.12	11.20	.11	.00	.00	22.55	.23
7	19.44	.66	9.97	.34	.00	.00	29.42	1.00
8	9.48	1.82	9.17	1.76	.00	.00	18.65	3.57
9	2.64	3.76	9.88	14.09	.00	.00	12.51	17.85
10	9.45	.49	1.74	.09	.00	.00	11.20	.58
11	6.01	.67	4.21	.47	.00	.00	10.22	1.14



Black Sea I 11 Cups Not poisoned; Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
NON COMBUSTIBLE FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

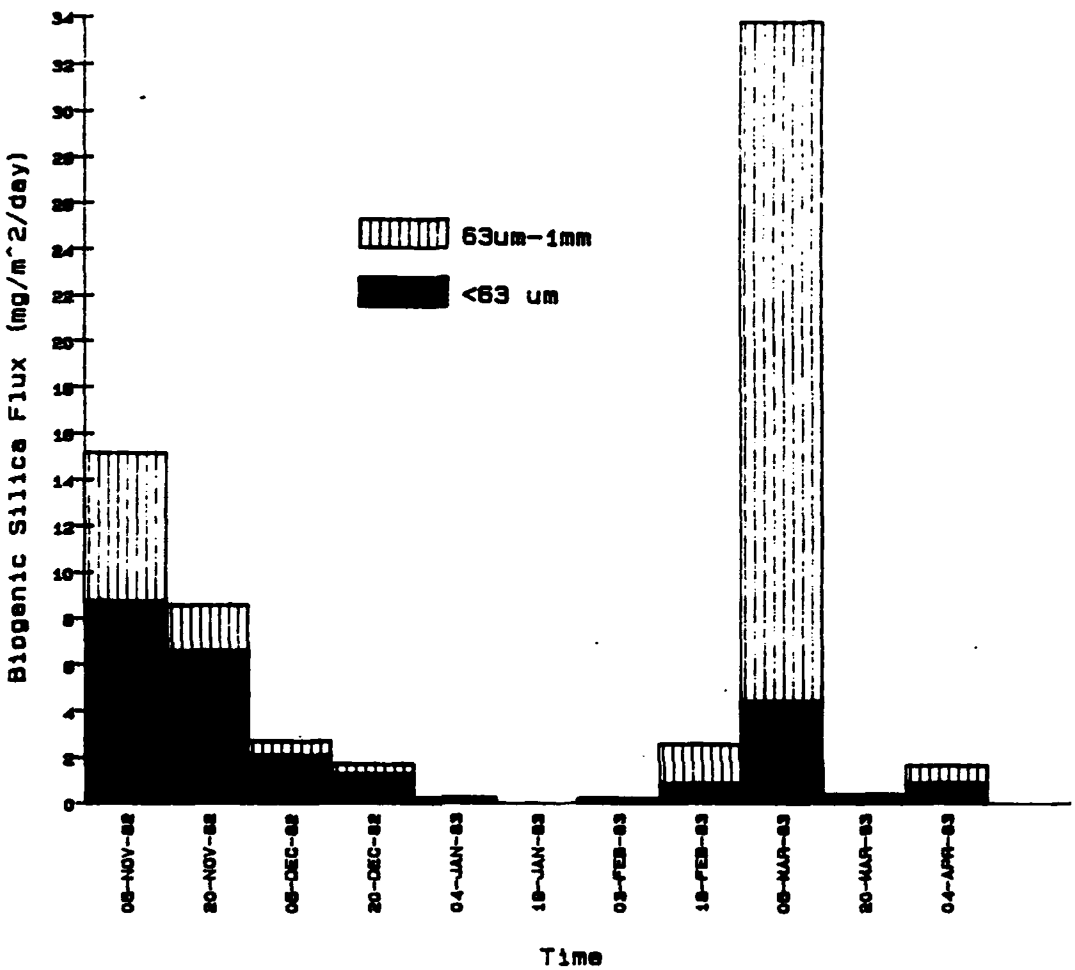
Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	16.32	50.53	5.06	15.67	.04	.13	21.43	66.32
2	31.16	59.00	6.11	11.57	.72	1.37	37.99	71.93
3	40.67	28.83	9.54	6.76	.39	.28	50.60	35.86
4	41.05	17.05	11.99	4.98	.08	.03	53.13	22.06
5	35.85	3.24	14.07	1.27	.00	.00	49.92	4.51
6	24.09	.25	28.95	.30	.00	.00	53.04	.54
7	30.70	1.04	15.83	.54	.00	.00	46.53	1.58
8	27.91	5.35	33.87	6.49	.00	.00	61.78	11.84
9	9.92	14.15	64.48	91.97	.00	.00	74.40	106.12
10	53.11	2.77	21.17	1.10	.00	.00	74.28	3.87
11	45.44	5.08	34.36	3.84	.00	.00	79.81	8.91



Black Sea I 11 Cups Not poisoned; Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
Combustible Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	12.37	38.27	6.27	19.39	.06	.19	18.69	57.85
2	11.34	21.47	4.60	8.71	.56	1.05	16.50	31.24
3	10.68	7.57	4.22	2.99	.31	.22	15.21	10.78
4	11.22	4.66	6.02	2.50	.04	.02	17.28	7.18
5	10.74	.97	6.71	.61	0.00	0.00	17.45	1.58
6	8.67	.09	16.71	.17	0.00	0.00	25.39	.26
7	13.09	.45	10.96	.37	0.00	0.00	24.05	.82
8	9.06	1.74	10.50	2.01	0.00	0.00	19.56	3.75
9	1.98	2.82	11.46	16.34	0.00	0.00	13.44	19.16
10	8.45	.44	5.88	.31	0.00	0.00	14.33	.75
11	4.68	.52	5.29	.59	0.00	0.00	9.98	1.11

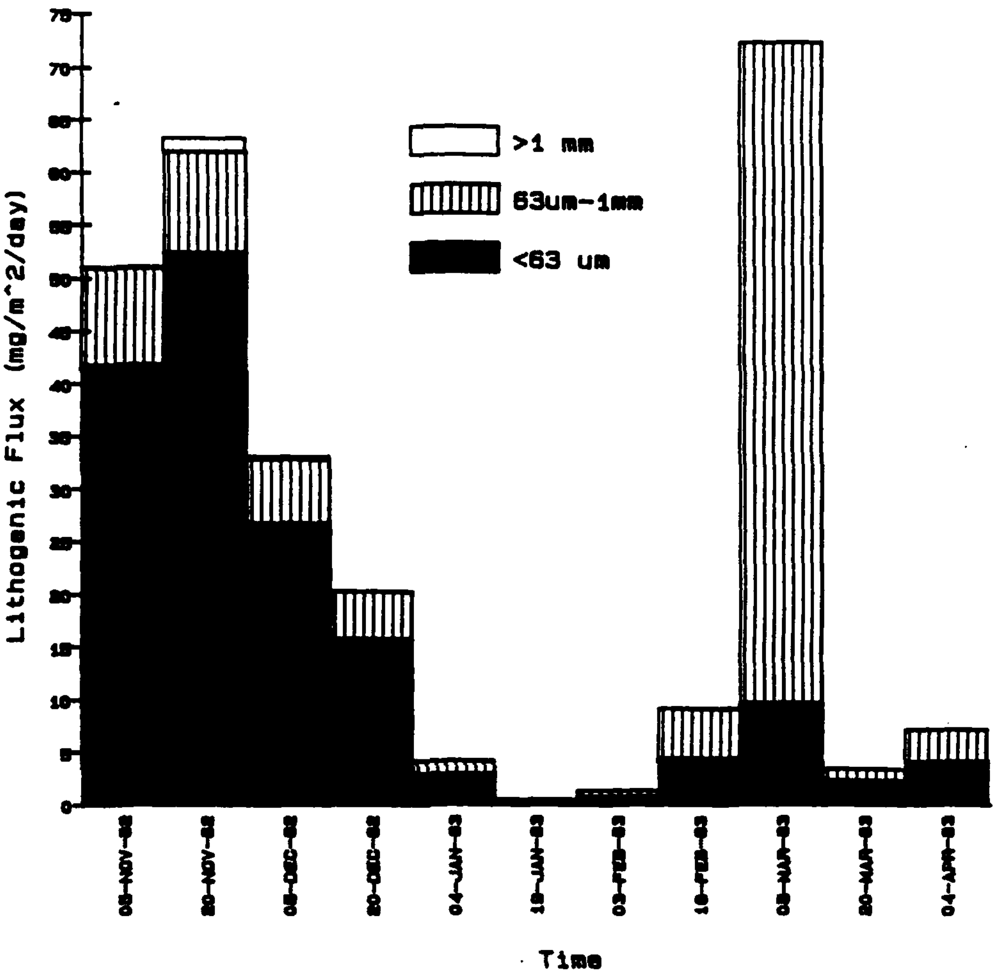
Biogenic Silica Flux at Black Sea 1, 1150 m



Black Sea I 11 Cups Not poisoned; Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
OPAL Flux
Ttl is Total Flux in all size classes.

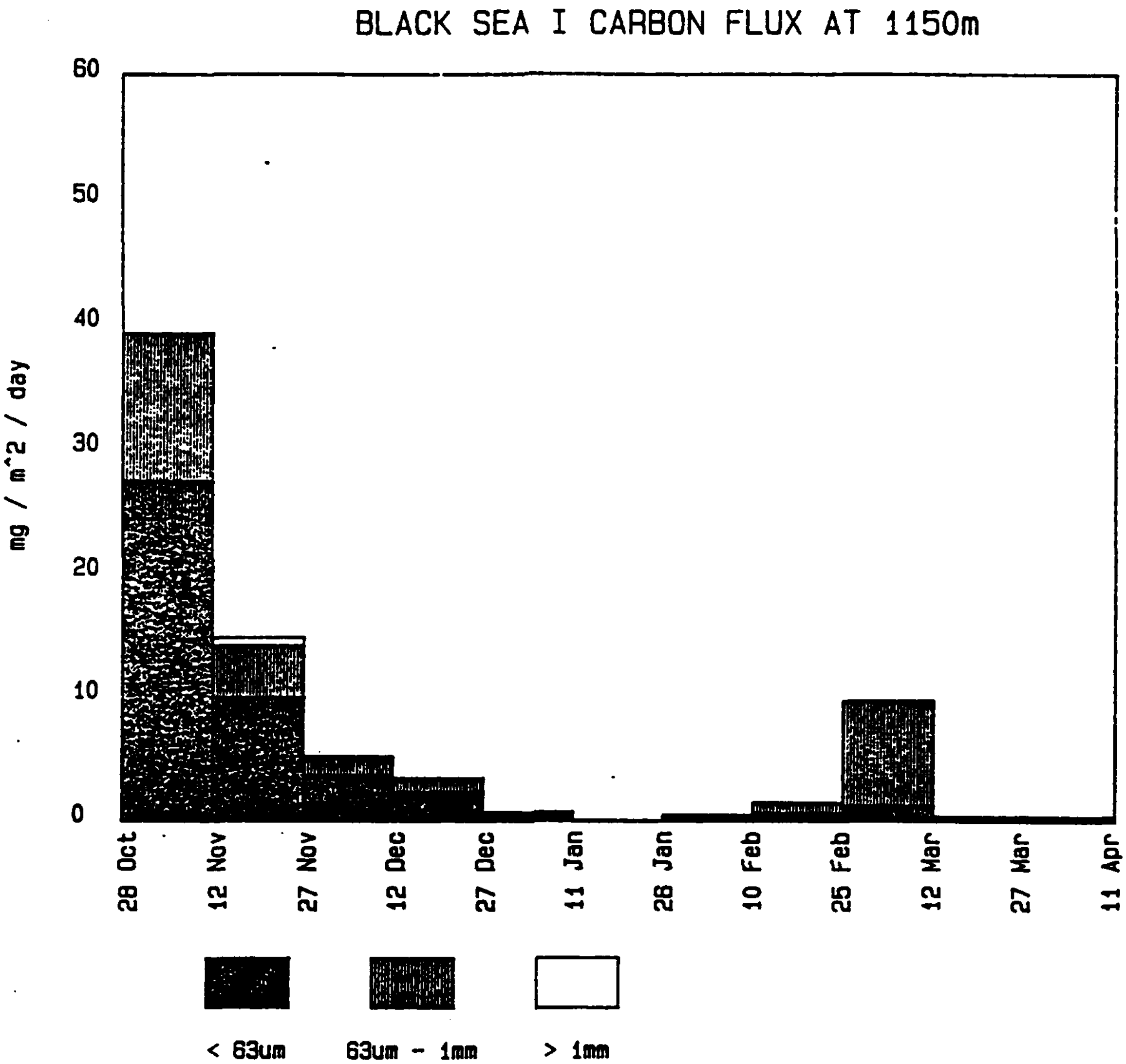
cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	2.82	8.73	2.09	6.46	0.00	0.00	4.91	15.19
2	3.48	6.59	1.07	2.03	0.00	0.00	4.56	8.63
3	2.95	2.09	.92	.65	0.00	0.00	3.87	2.74
4	3.09	1.28	1.08	.45	0.00	0.00	4.18	1.73
5	2.65	.24	0.00	0.00	0.00	0.00	2.65	.24
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	5.49	.19	0.00	0.00	0.00	0.00	5.49	.19
8	4.61	.88	9.09	1.74	0.00	0.00	13.70	2.63
9	3.10	4.42	20.57	29.33	0.00	0.00	23.66	33.75
10	7.76	.40	0.00	0.00	0.00	0.00	7.76	.40
11	8.08	.90	6.98	.78	0.00	0.00	15.06	1.68

Lithogenic Flux at Black Sea 1, 1150 m, 1982-83



Sample I.D.	LITH <63	LITH<63 %ncmb.	LITH 63-1	LITH63-1 %ncmb.	LITH >1	LITH>1 %ncmb.	LITH total	LITH %total
BS1-1200-1	41.80	63.03	9.21	13.89	0.13	0.20	51.14	77.11
BS1-1200-2	52.40	72.85	9.53	13.25	1.37	1.90	63.30	88.01
BS1-1200-3	26.74	74.56	6.11	17.04	0.28	0.78	33.13	92.38
BS1-1200-4	15.76	71.43	4.53	20.53	0.03	0.14	20.32	92.10
BS1-1200-5	3.00	66.52	1.27	28.16			4.27	94.68
BS1-1200-6	0.25	46.30	0.30	55.56			0.55	100.00
BS1-1200-7	0.86	52.76	0.54	33.13			1.40	85.89
BS1-1200-8	4.46	37.67	4.75	40.12			9.21	77.79
BS1-1200-9	9.73	9.20	62.63	59.21			72.36	68.41
BS1-1200-10	2.36	60.98	1.10	28.42			3.46	89.41
BS1-1200-11	4.17	46.80	3.06	34.34			7.23	81.14
BS1-1200-12*								

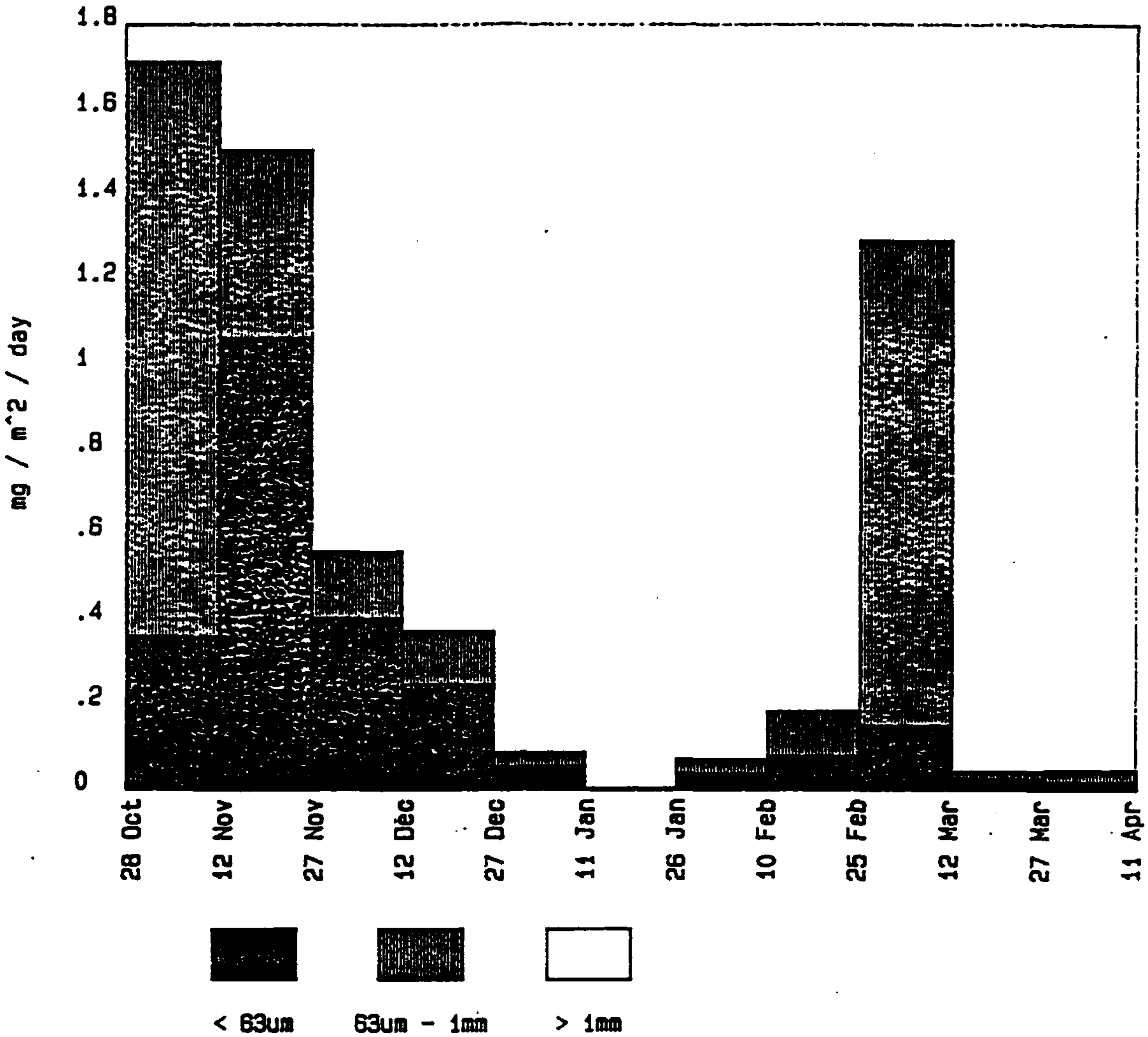
Flux is in mg/m^2/day.



Black Sea I 11 Cups Not poisoned; Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
CARBON FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um % of Cmb	< 63um FLUX	63um - 1 % of Cmb	63um - 1 FLUX	> 1mm % of Cmb	> 1mm FLUX	TOTAL % of Cmb	TOTAL FLUX
1	48.15	27.86	20.73	11.99			68.87	39.85
2	32.46	10.14	13.68	4.27	2.08	.65	48.22	15.06
3	35.01	3.77	14.01	1.51			49.02	5.28
4	33.39	2.40	15.33	1.10			48.72	3.50
5	29.63	.47	17.34	.27	0.00	0.00	46.98	.74
6								
7	30.17	.25	31.77	.26	0.00	0.00	61.94	.51
	18.28	.68	22.80	.85	0.00	0.00	41.07	1.54
.	6.70	1.28	44.82	8.59	0.00	0.00	51.53	9.87
10	27.10	.20	23.15	.17	0.00	0.00	50.26	.38
11	13.67	.15	20.63	.23	.00	.00	34.30	.38

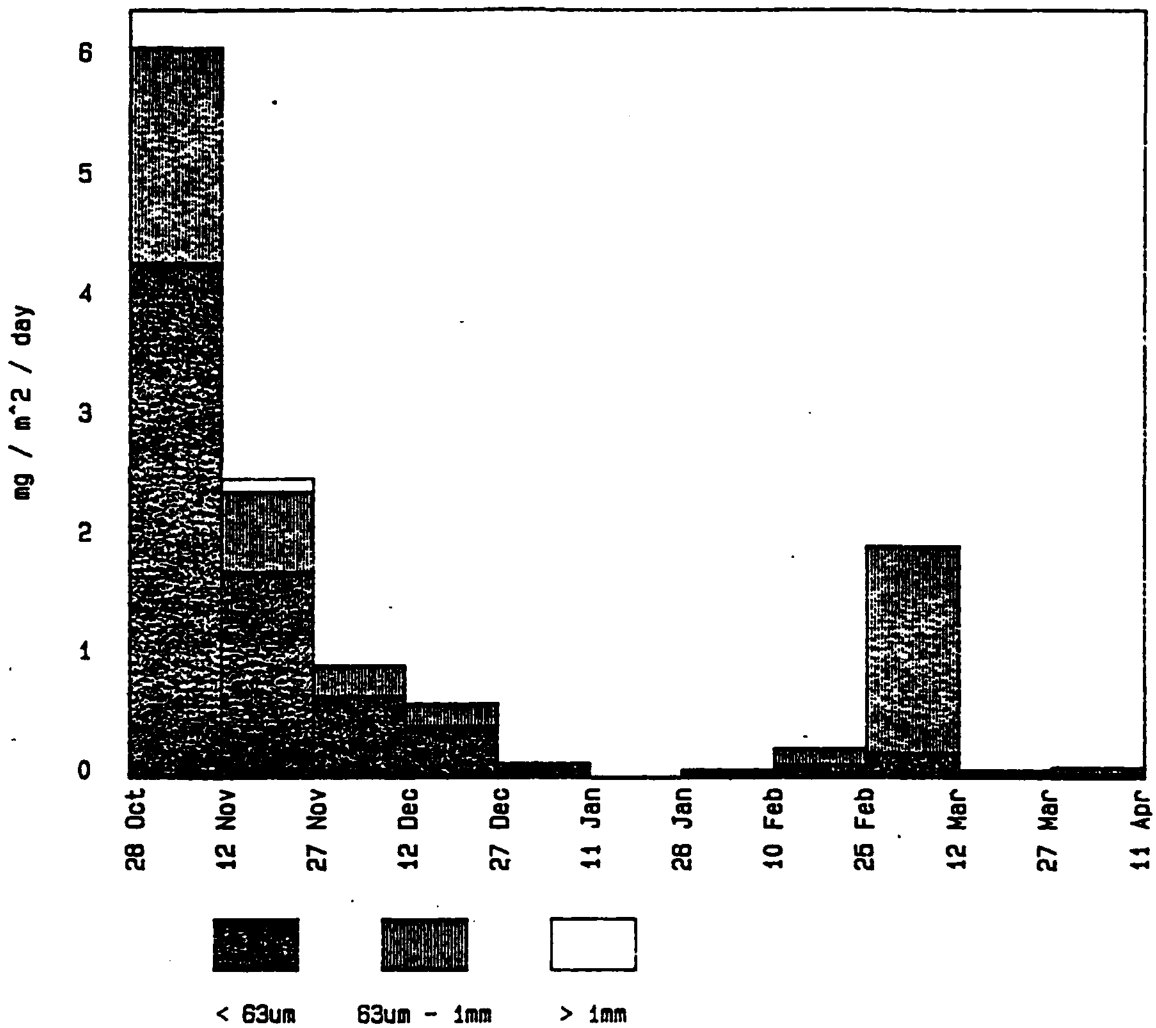
BLACK SEA I NITROGEN FLUX AT 1150m



Black Sea I   11 Cups   Not poisoned: Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
NITROGEN FLUX   (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	.63	.36	2.37	1.37	0.00	0.00	3.00	1.73
2	3.45	1.08	1.43	.45	0.00	0.00	4.09	1.53
3	3.78	.41	1.47	.16	0.00	0.00	5.26	.57
4	3.48	.25	1.76	.13	0.00	0.00	5.24	.38
5	3.47	.05	2.08	.03	0.00	0.00	5.56	.09
6								
7	4.57	.04	4.13	.03	0.00	0.00	8.70	.07
	2.14	.08	2.81	.11	0.00	0.00	4.95	.19
9	.80	.15	6.05	1.16	0.00	0.00	6.84	1.31
10	3.35	.03	2.40	.02	0.00	0.00	5.75	.04
11	1.61	.02	2.50	.03	.00	.00	4.11	.05

BLACK SEA I HYDROGEN FLUX AT 1150m



Black Sea I 11 Cups Not poisoned: Deployed and recovered from R/V K Piri Reis
Mark 5 trap open from October 10 1982 to April 11 1983 at 1150 meters.
HYDROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	7.57	4.38	3.13	1.81			10.69	6.19
2	5.62	1.75	2.19	.68	.35	.11	8.15	2.55
3	6.41	.69	2.40	.26			8.81	.95
4	6.11	.44	2.62	.19			8.73	.63
5	4.94	.08	2.81	.04	0.00	0.00	7.75	.12
6								
7	4.30	.04	4.21	.03	0.00	0.00	8.51	.07
	3.04	.11	3.65	.14	0.00	0.00	6.70	.25
9	1.12	.22	9.16	1.75	0.00	0.00	10.28	1.97
10	5.63	.04	3.38	.03	0.00	0.00	9.00	.07
11	3.22	.04	4.93	.05	.00	.00	8.15	.09

Experiment BS-2

Flux at 307 m and 1,249 m deep

May 18, 1983

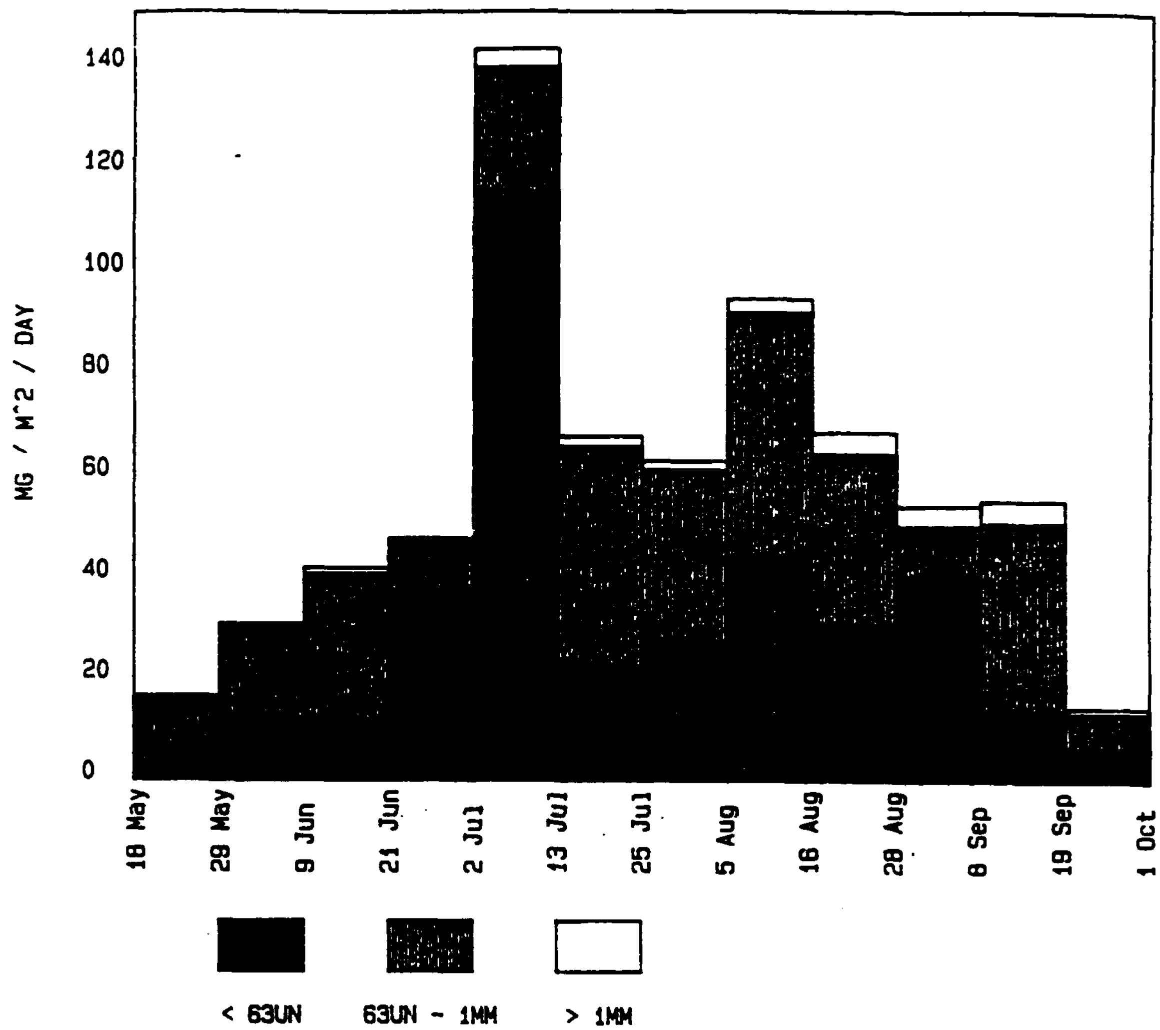
to

October 1, 1983

at

11.33 day intervals

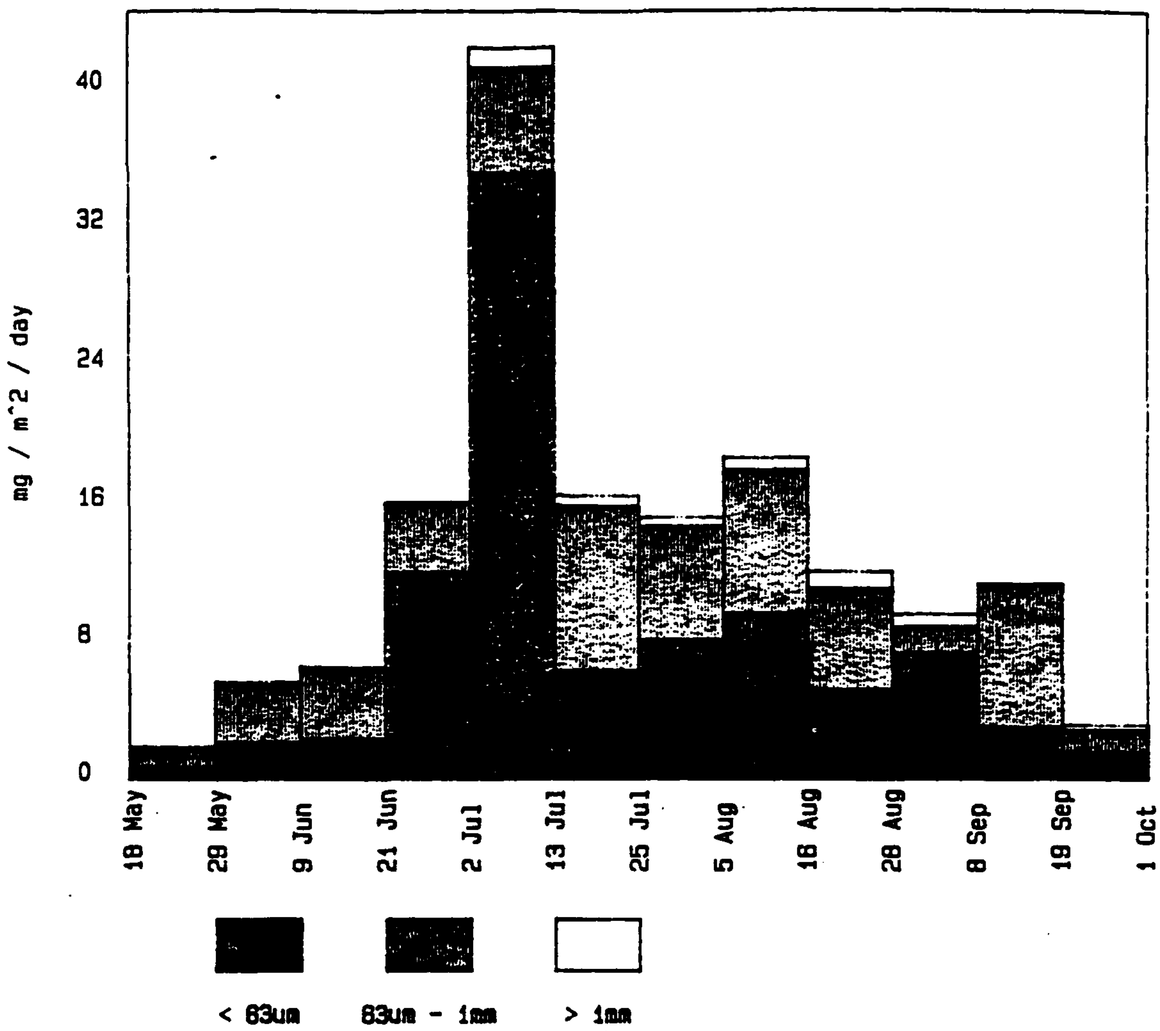
Black Sea II Total Flux at 250 M



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	21.17	3.52	74.86	12.45	3.97	.66	100.00	16.63
2	33.01	10.32	65.52	20.48	1.47	.46	100.00	31.26
3	28.16	11.97	69.04	29.34	2.80	1.19	100.00	42.50
4	76.41	36.96	23.57	11.40	0.00	0.00	100.00	48.37
5	80.77	117.27	16.79	24.38	2.44	3.54	100.00	145.19
6	33.15	22.81	63.94	44.00	2.91	2.00	100.00	68.81
7	43.47	27.84	53.76	34.43	2.76	1.77	100.00	64.04
8	46.84	45.05	50.36	48.44	2.80	2.69	100.00	96.18
9	44.83	31.21	49.01	34.12	6.16	4.29	100.00	69.62
10	74.47	41.02	18.36	10.11	7.19	3.96	100.00	55.08
11	24.62	13.81	67.43	37.83	7.95	4.46	100.00	56.10
12	44.11	6.40	48.93	7.10	6.96	1.01	100.00	14.51

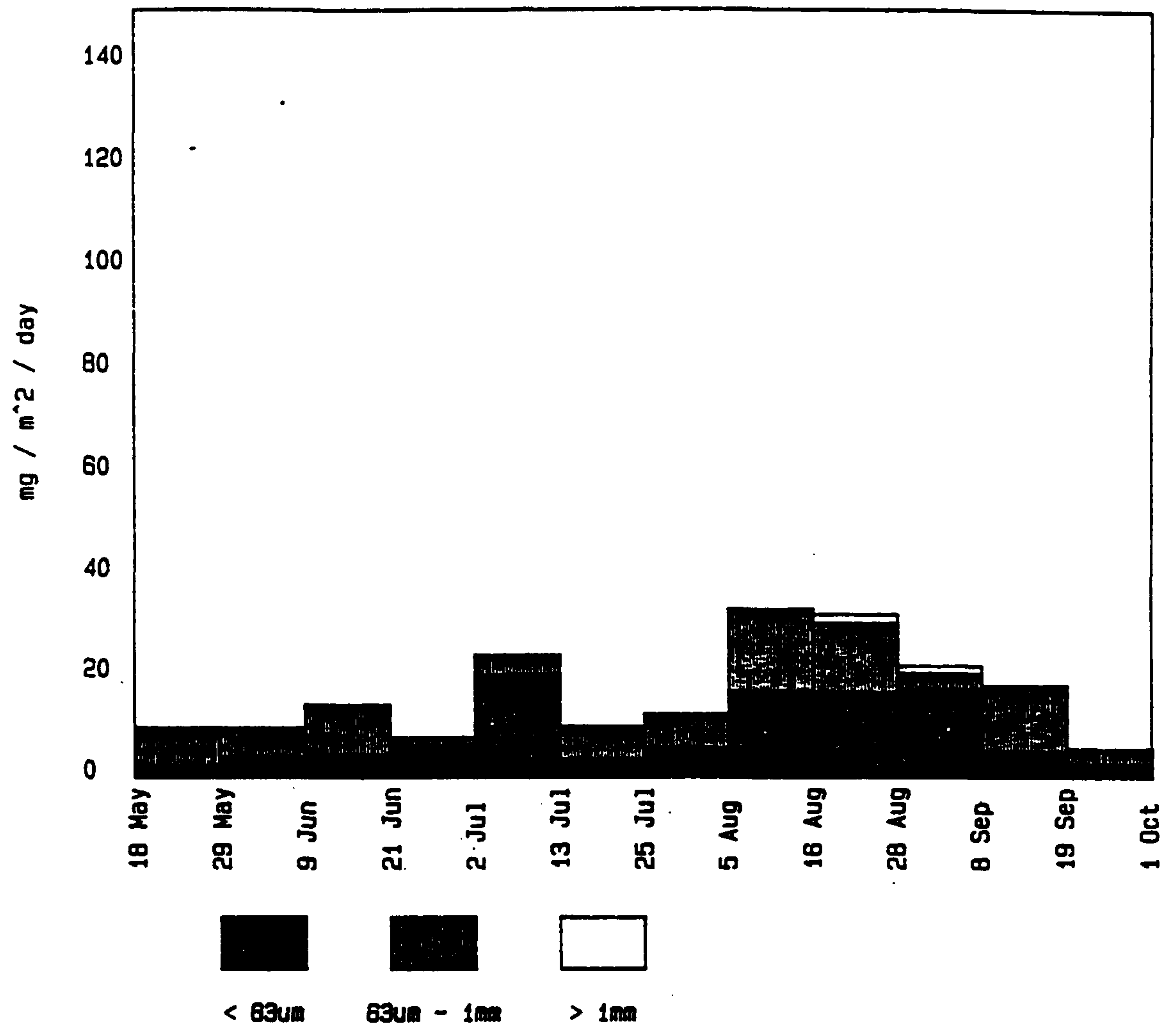
BLACK SEA II CARBONATE FLUX AT 250m



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
Carbonate Flux
Ttl is total Flux in all size classes

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	4.06	.68	6.61	1.10	.76	.13	11.43	1.90
2	6.88	2.15	10.86	3.40	.50	.16	18.24	5.70
3	5.59	2.38	9.41	4.00	.50	.21	15.50	6.59
4	25.18	12.18	8.44	4.08	0.00	0.00	33.62	16.26
5	24.48	35.54	4.22	6.13	.80	1.16	29.50	42.83
6	9.19	6.32	14.15	9.74	.89	.61	24.23	16.67
7	12.72	8.15	10.49	6.72	.83	.53	24.05	15.40
8	10.14	9.75	8.78	8.44	.75	.72	19.66	18.91
9	7.52	5.23	8.61	5.99	1.42	.99	17.55	12.22
10	13.41	7.39	2.84	1.56	1.34	.74	17.59	9.69
11	5.45	3.05	15.01	8.42			20.46	11.48
12	10.75	1.56	9.05	1.31	1.96	.28	21.76	3.16

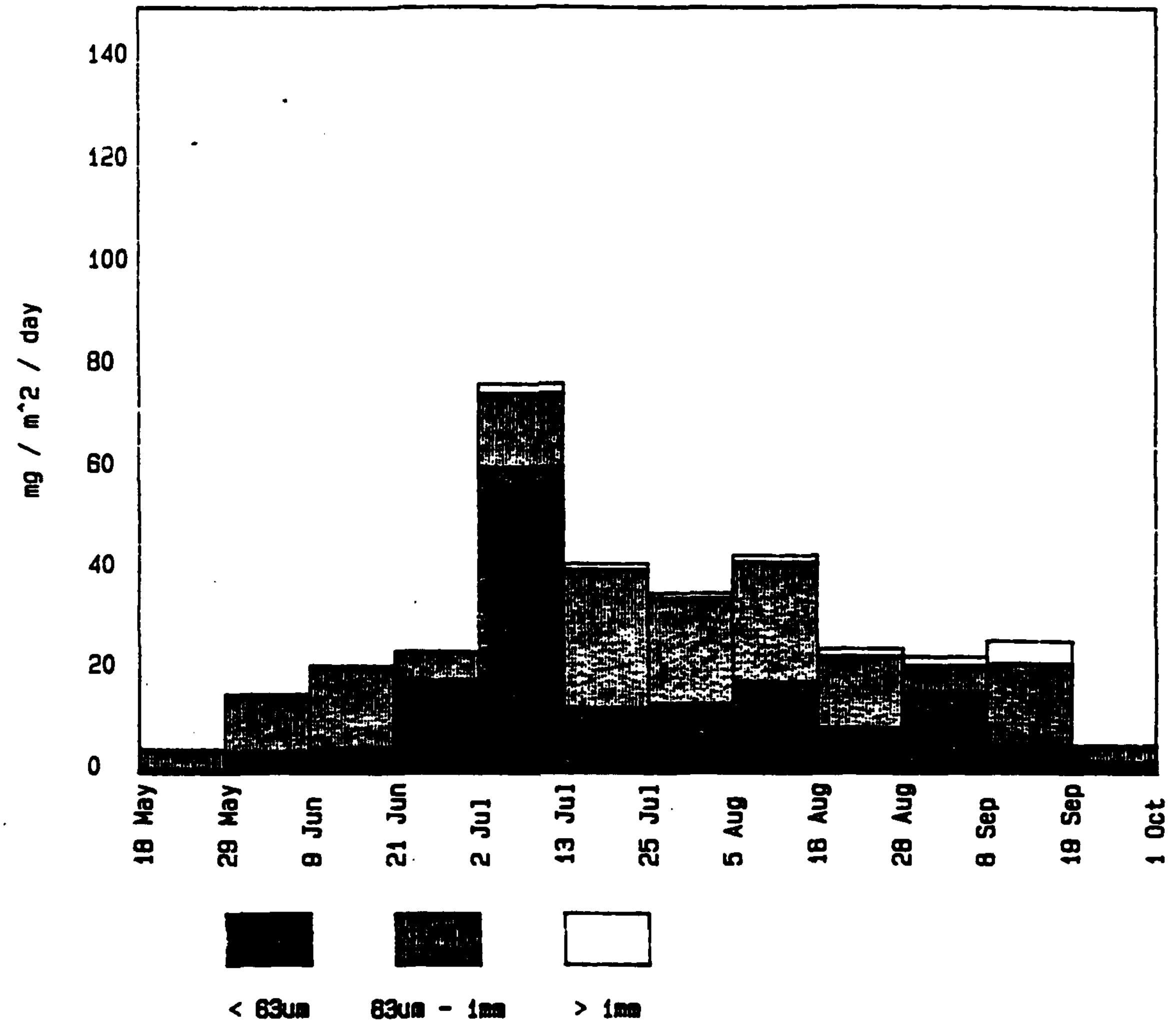
BLACK SEA II NON-COMBUSTIBLE FLUX AT 250m



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
NON COMBUSTIBLE FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	12.68	2.11	45.74	7.61	1.67	.28	60.10	9.99
2	12.57	3.93	18.71	5.85	.31	.10	31.59	9.87
3	10.44	4.44	22.96	9.76	.69	.29	34.10	14.49
4	12.78	6.18	3.49	1.69	0.00	0.00	16.27	7.87
5	14.00	20.33	2.48	3.59	.34	.50	16.82	24.42
6	5.14	3.54	9.26	6.37	.40	.28	14.80	10.19
7	9.13	5.85	10.18	6.52	.42	.27	19.73	12.64
8	17.77	17.09	16.46	15.83	.73	.71	34.97	33.63
9	24.23	16.87	19.88	13.84	2.62	1.83	46.73	32.53
10	31.70	17.46	5.90	3.25	2.68	1.48	40.27	22.18
11	9.02	5.06	23.53	13.20			32.55	18.26
12	17.51	2.54	19.75	2.87	2.57	.37	39.83	5.78

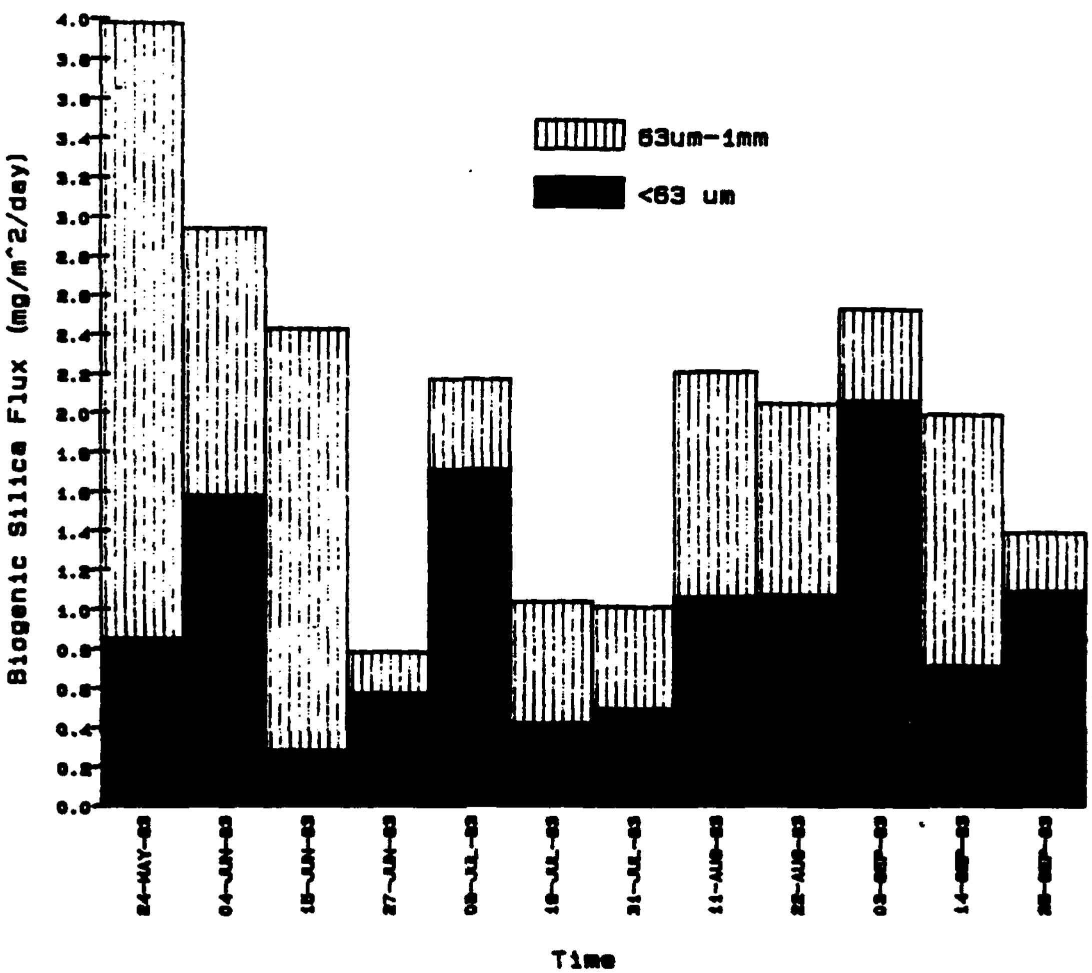
BLACK SEA II COMBUSTIBLE FLUX AT 250m



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
Combustible Flux
Ttl is total Flux in all size classes

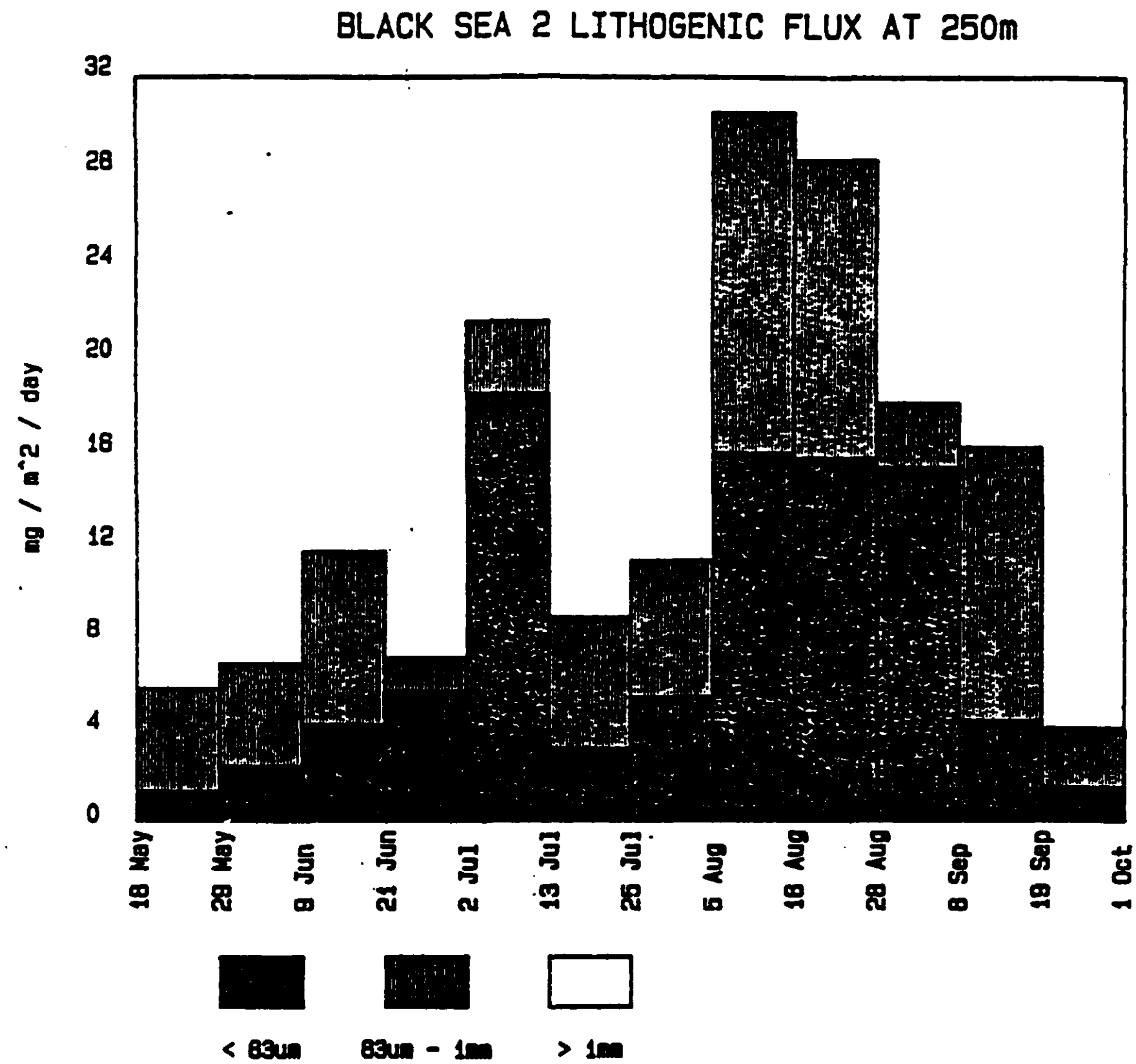
Cup #	< 63um % of Ttl	< 63um FLUX	63um - 1 % of Ttl	63um - 1 FLUX	> 1mm % of Ttl	> 1mm FLUX	TOTAL % of Ttl	TOTAL FLUX
1	4.42	.73	22.51	3.74	1.54	.26	28.47	4.73
2	13.56	4.24	35.94	11.23	.67	.21	50.17	15.68
3	12.13	5.15	36.66	15.58	1.61	.68	50.40	21.42
4	38.45	18.60	11.64	5.63	0.00	0.00	50.09	24.23
5	42.29	61.40	10.10	14.66	1.30	1.88	53.68	77.94
6	18.82	12.95	40.54	27.89	1.62	1.11	60.97	41.95
7	21.62	13.84	33.09	21.19	1.51	.97	56.22	36.00
8	18.93	18.21	25.13	24.17	1.32	1.27	45.37	43.64
9	13.08	9.11	20.52	14.29	2.12	1.47	35.72	24.87
10	29.36	16.17	9.62	5.30	3.17	1.75	42.16	23.22
11	10.15	5.69	28.90	16.21			46.99	26.36
12	15.84	2.30	20.14	2.92	2.43	.35	38.41	5.57

Biogenic Silica Flux at Black Sea 2, 250 m



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
OPAL Flux
Ttl is Total Flux in all size classes.

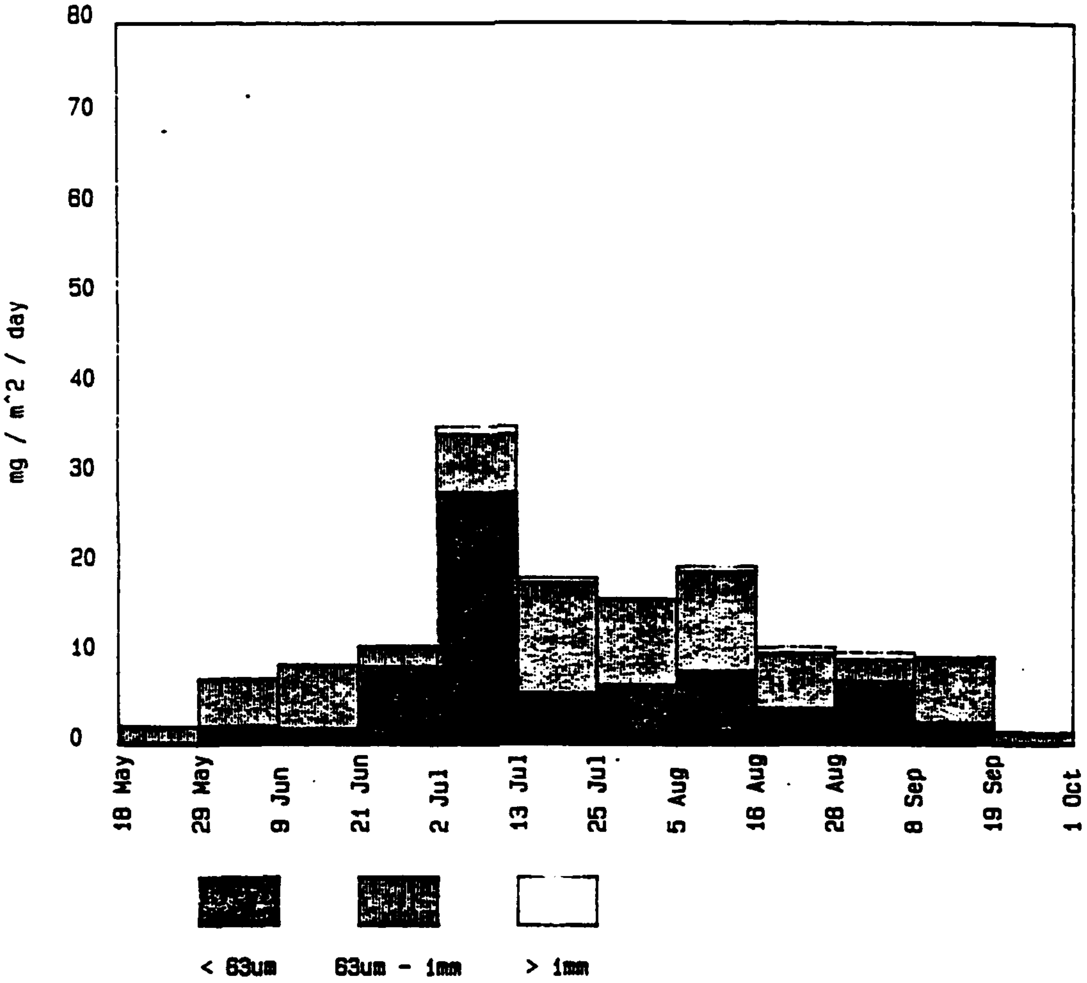
Cup #	< 63um % of Ttl	< 63um FLUX	63um - 1 % of Ttl	63um - 1 FLUX	> 1mm % of Ttl	> 1mm FLUX	TOTAL % of Ttl	TOTAL FLUX
1	5.13	.85	18.81	3.13	0.00	0.00	23.94	3.98
2	5.06	1.58	4.34	1.36	0.00	0.00	9.40	2.94
3	.67	.28	5.07	2.15	0.00	0.00	5.74	2.44
4	1.17	.57	.43	.21	0.00	0.00	1.61	.78
5	1.18	1.71	.32	.46	0.00	0.00	1.50	2.18
6	.61	.42	.91	.62	0.00	0.00	1.52	1.04
7	.77	.49	.81	.52	0.00	0.00	1.57	1.01
8	1.11	1.06	1.20	1.15	0.00	0.00	2.31	2.22
9	1.54	1.07	1.41	.98	0.00	0.00	2.95	2.05
0	3.74	2.06	.86	.47	0.00	0.00	4.60	2.54
11	1.26	.71	2.28	1.28	0.00	0.00	3.53	1.98
12	7.54	1.09	2.04	.30	0.00	0.00	9.58	1.39



Sample I.D.	LITH <63	LITH<63 %total	LITH 63-1	LITH63-1 %total	LITH total	LITHtot. %total
BS2-250-1*	1.26	7.56	4.48	26.94	5.74	36.16
BS2-250-2*	2.35	7.50	4.49	14.37	6.84	22.18
BS2-250-3*	4.15	9.77	7.60	17.89	11.75	28.36
BS2-250-4*	5.61	11.61	1.48	3.06	7.09	14.67
BS2-250-5*	18.61	12.82	3.13	2.16	21.74	15.32
BS2-250-6*	3.12	4.53	5.75	8.35	8.87	13.29
BS2-250-7*	5.36	8.37	6.00	9.37	11.36	18.16
BS2-250-8*	16.03	16.67	14.68	15.26	30.71	32.66
BS2-250-9*	15.80	22.69	12.86	18.47	28.66	43.79
BS2-250-10*	15.40	27.95	2.77	5.04	18.17	35.67
BS2-250-11*	4.36	7.76	11.92	21.25	16.28	29.02
BS2-250-12*	1.45	9.97	2.57	17.71	4.02	30.25

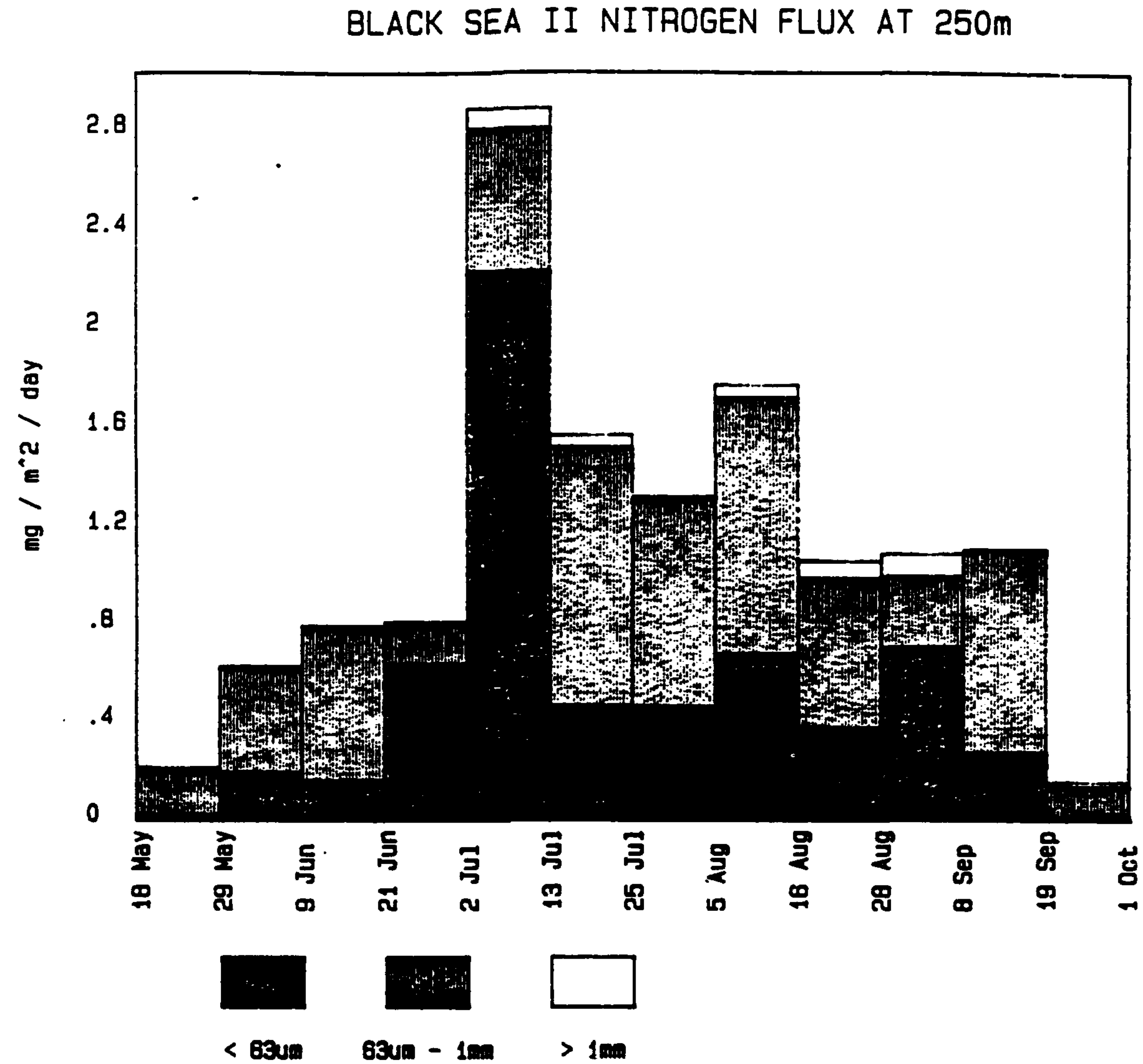
Flux is in mg/m^2/day.

BLACK SEA II CARBON FLUX AT 250m



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
CARBON FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

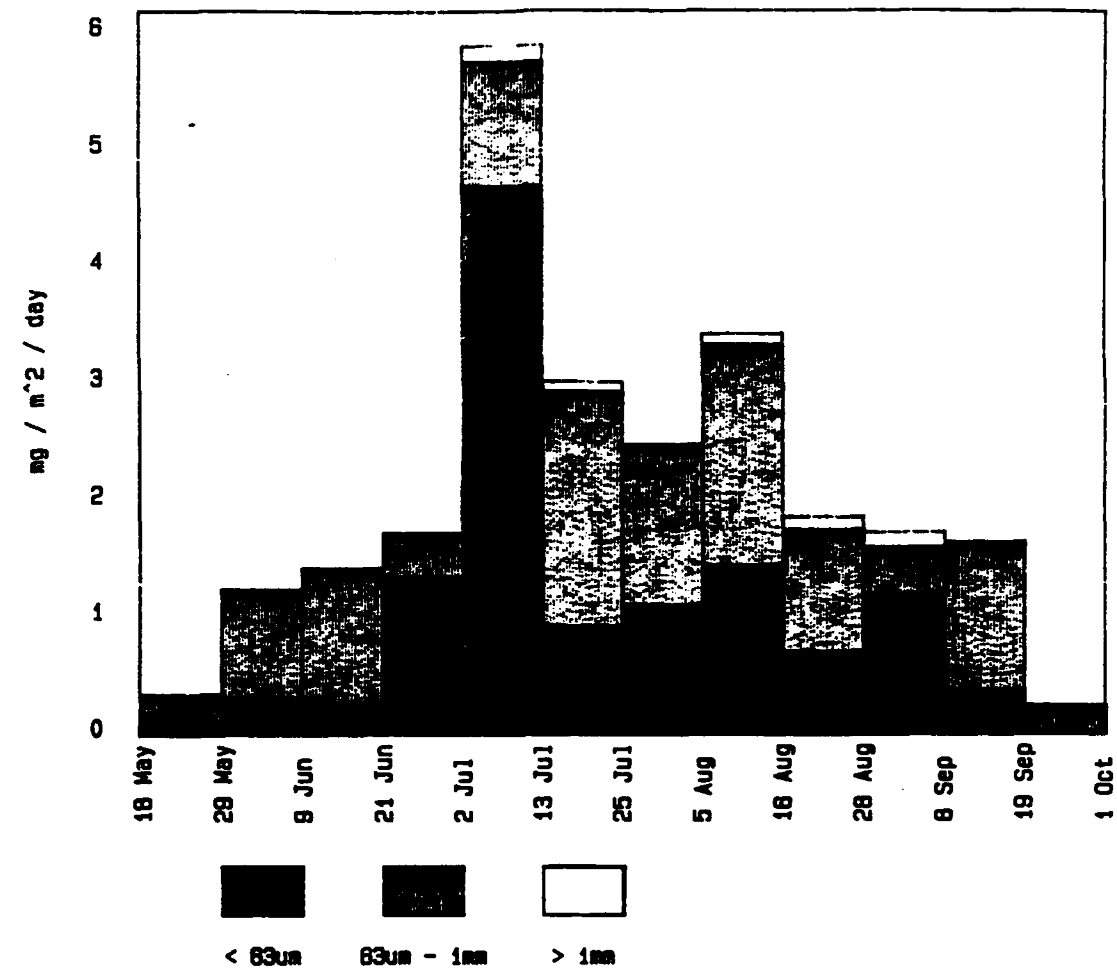
Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1			38.21	1.81	2.84	.13	43.63	2.07
2	13.19	2.07	33.68	5.28			46.87	7.35
3	8.21	1.76	33.22	7.12			41.43	8.87
4	36.05	8.73	9.38	2.27			45.42	11.00
5	36.53	28.47	8.37	6.52	1.11	.86	46.01	35.86
6	13.81	5.79	29.54	12.39	1.24	.52	44.59	18.71
7	18.61	6.70	26.78	9.64			45.39	16.34
8	18.95	8.27	25.76	11.24	1.26	.55	45.98	20.06
9	16.31	4.06	24.90	6.19	2.63	.66	43.85	10.91
10	30.69	7.13	10.40	2.42	3.41	.79	44.50	10.33
11	11.55	2.53	33.26	7.28			44.81	9.82
12			23.39	1.30		.17	26.41	1.47



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
NITROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	.51	.02	3.91	.19	.22	.01	4.64	.22
2	1.28	.20	2.80	.44			4.08	.64
3	.77	.17	2.99	.64			3.77	.81
4	2.68	.65	.72	.17			3.40	.82
5	2.90	2.26	.75	.58	.10	.08	3.76	2.93
6	1.13	.47	2.55	1.07	.12	.05	3.80	1.59
7	1.31	.47	2.42	.87			3.72	1.34
8	1.59	.69	2.41	1.05	.12	.05	4.12	1.80
9	1.55	.38	2.50	.62	.29	.07	4.33	1.08
10	3.10	.72	1.27	.29	.40	.09	4.77	1.11
11	1.28	.28	3.84	.84			5.12	1.12
12			2.52	.14	.30	.02	2.84	.16

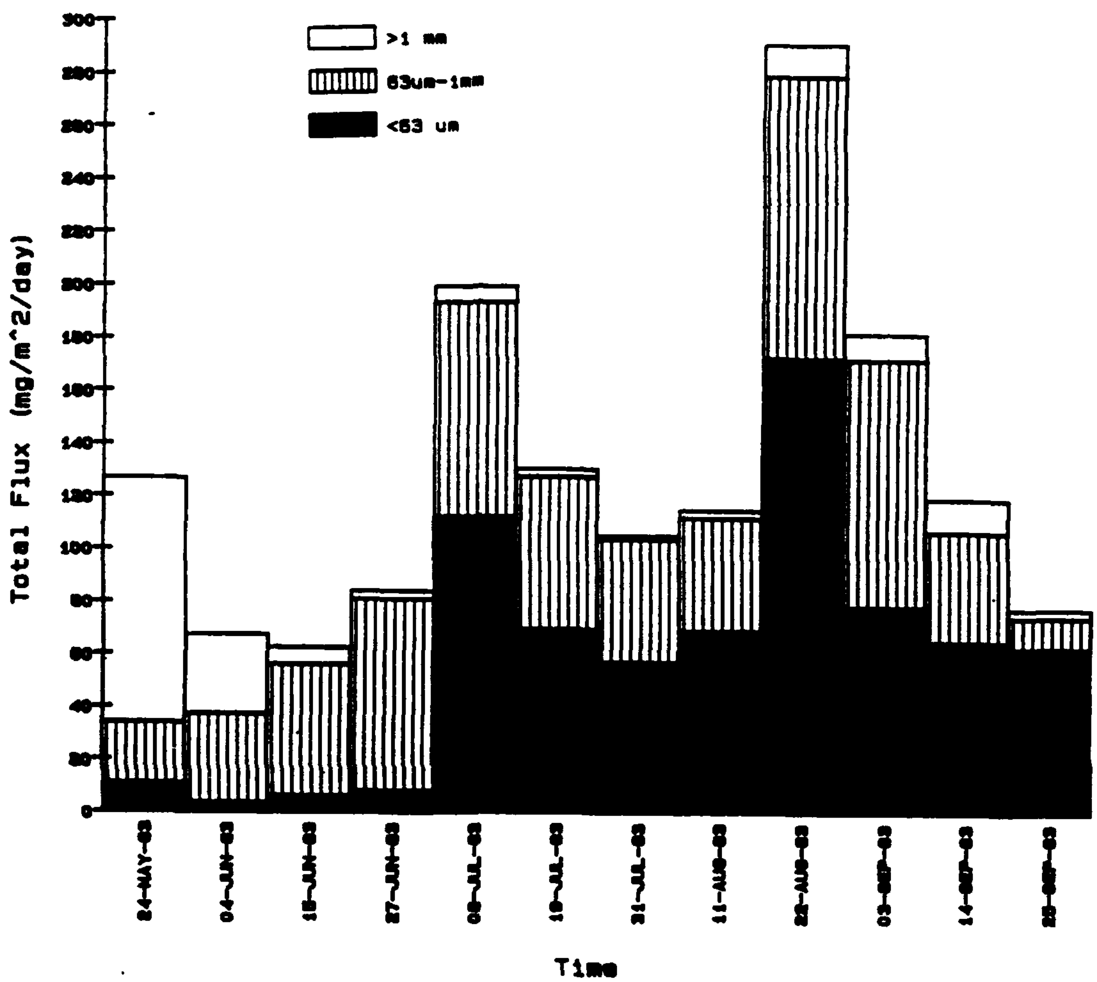
BLACK SEA II HYDROGEN FLUX AT 250m



Black Sea II
Mark 5 trap open from May 18 1983 to October 1 1983 at 250 meters.
HYDROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	.47	.02	6.47	.31	.41	.02	7.35	.35
2	2.00	.31	6.02	.94			8.02	1.26
3	1.25	.27	5.49	1.18			6.74	1.44
4	5.64	1.37	1.57	.38			7.21	1.75
5	6.10	4.76	1.38	1.07	.18	.14	7.65	5.97
6	2.24	.94	4.85	2.04	.20	.08	7.29	3.06
7	3.12	1.12	3.88	1.40	.00		7.00	2.52
8	3.37	1.47	4.39	1.92	.21	.09	7.97	3.48
9	2.89	.72	4.25	1.06	.44	.11	7.59	1.89
10	5.23	1.21	1.76	.41	.56	.13	7.54	1.75
11	1.72	.38	5.88	1.29			7.61	1.67
12			4.04	.23	.49	.03	4.54	.25

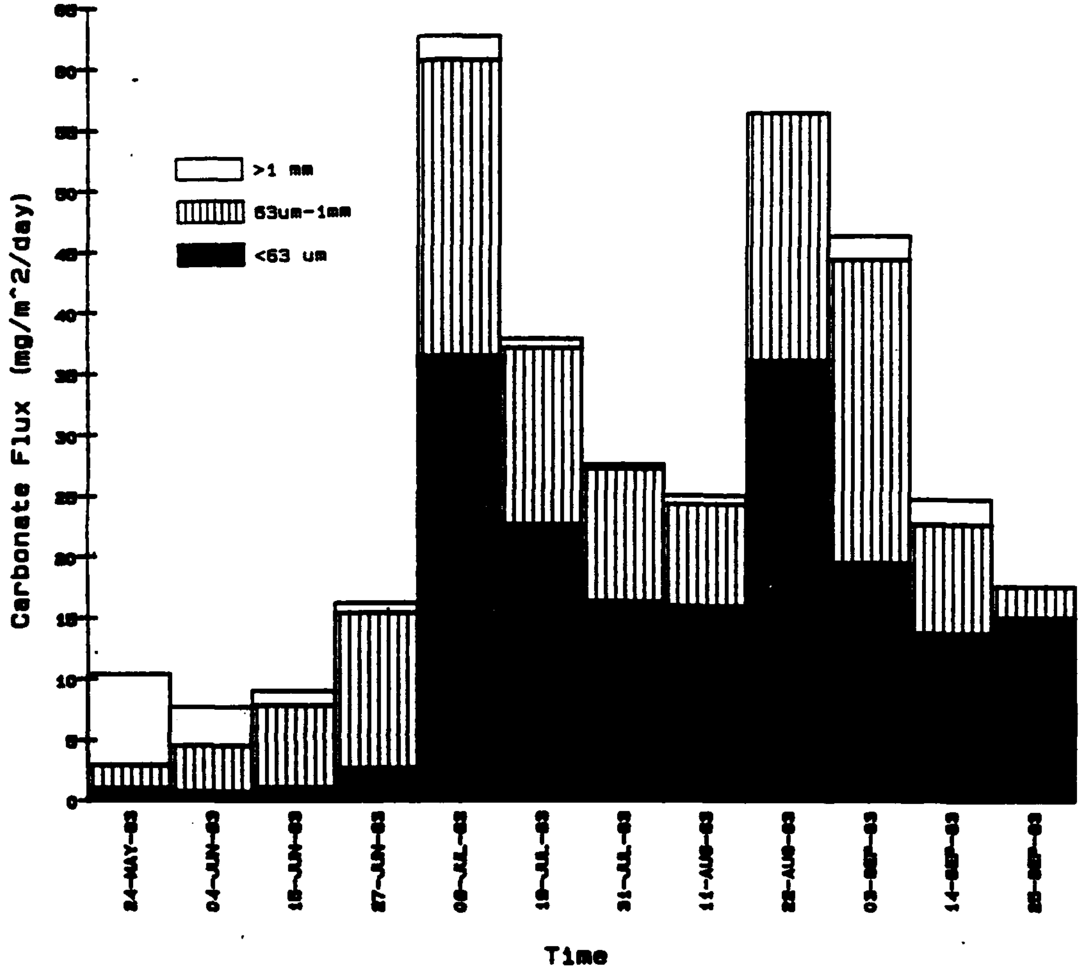
Total Flux at Black Sea 2. 1200 m, 1983



Black Sea II each cup was open for 11.33 days.
Mark 5 trap open from MAY 18 1983 to OCT 1 1983 at 1200 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	8.80	11.18	18.01	22.90	73.19	93.03	100.00	127.11
2	5.67	3.82	49.87	33.60	44.46	29.96	100.00	67.39
3	10.10	6.31	79.54	49.73	10.36	6.48	100.00	62.53
4	9.67	8.14	86.59	72.91	3.74	3.15	100.00	84.20
5	56.24	112.42	40.85	81.66	2.91	5.81	100.00	199.89
6	53.49	69.73	44.41	57.89	2.11	2.75	100.00	130.37
7	54.22	57.19	44.43	46.86	1.36	1.43	100.00	105.48
8	60.05	69.04	37.54	43.16	2.41	2.77	100.00	114.97
9	59.27	172.88	36.59	106.71	4.14	12.07	100.00	291.66
10	43.09	78.53	51.40	93.68	5.51	10.04	100.00	182.25
11	54.51	65.07	35.12	41.92	10.37	12.38	100.00	119.37
12	80.59	62.78	15.16	11.81	4.25	3.31	100.00	77.90

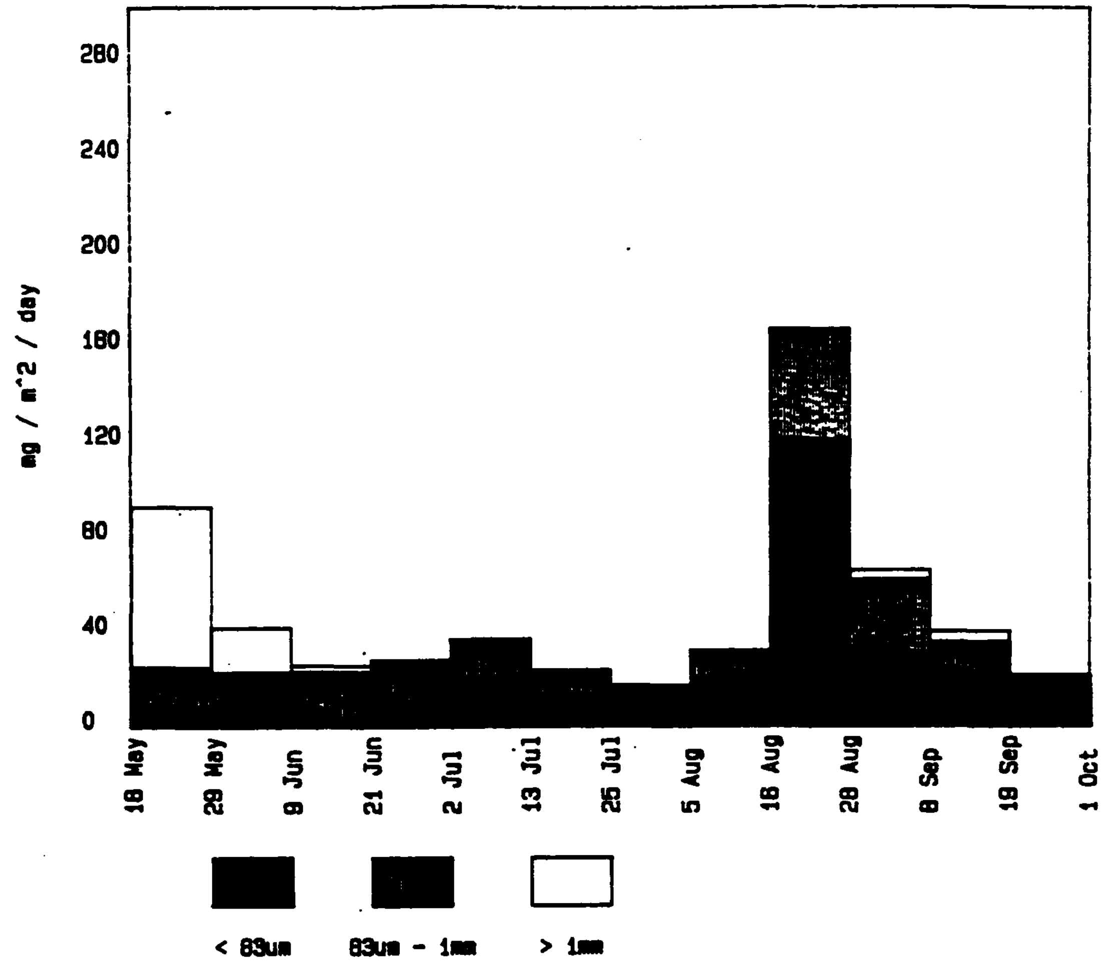
Carbonate Flux at Black Sea 2, 1200 m, 1983



Black Sea II each cup was open for 11.33 days.
Mark 5 trap open from MAY 18 1983 to OCT 1 1983 at 1200 meters.
Carbonate Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	.84	1.06	1.48	1.88	5.90	7.51	8.22	10.45
2	1.09	.73	5.67	3.82	4.76	3.21	11.52	7.76
3	1.73	1.08	10.80	6.75	1.91	1.20	14.45	9.03
4	3.24	2.73	15.14	12.75	1.03	.87	19.42	16.35
5	18.30	36.57	12.15	24.28	1.01	2.01	31.45	62.86
6	17.40	22.68	11.18	14.57	.62	.80	29.19	38.06
7	15.53	16.38	10.35	10.91	.43	.46	26.31	27.75
8	13.93	16.01	7.32	8.41	.62	.71	21.86	25.13
9	12.41	36.20	6.98	20.37			19.40	56.57
10	10.75	19.59	13.71	24.99	1.07	1.95	25.53	46.53
11	11.56	13.80	7.49	8.94	1.80	2.14	20.84	24.88
12	19.34	15.07	3.29	2.56			22.63	17.63

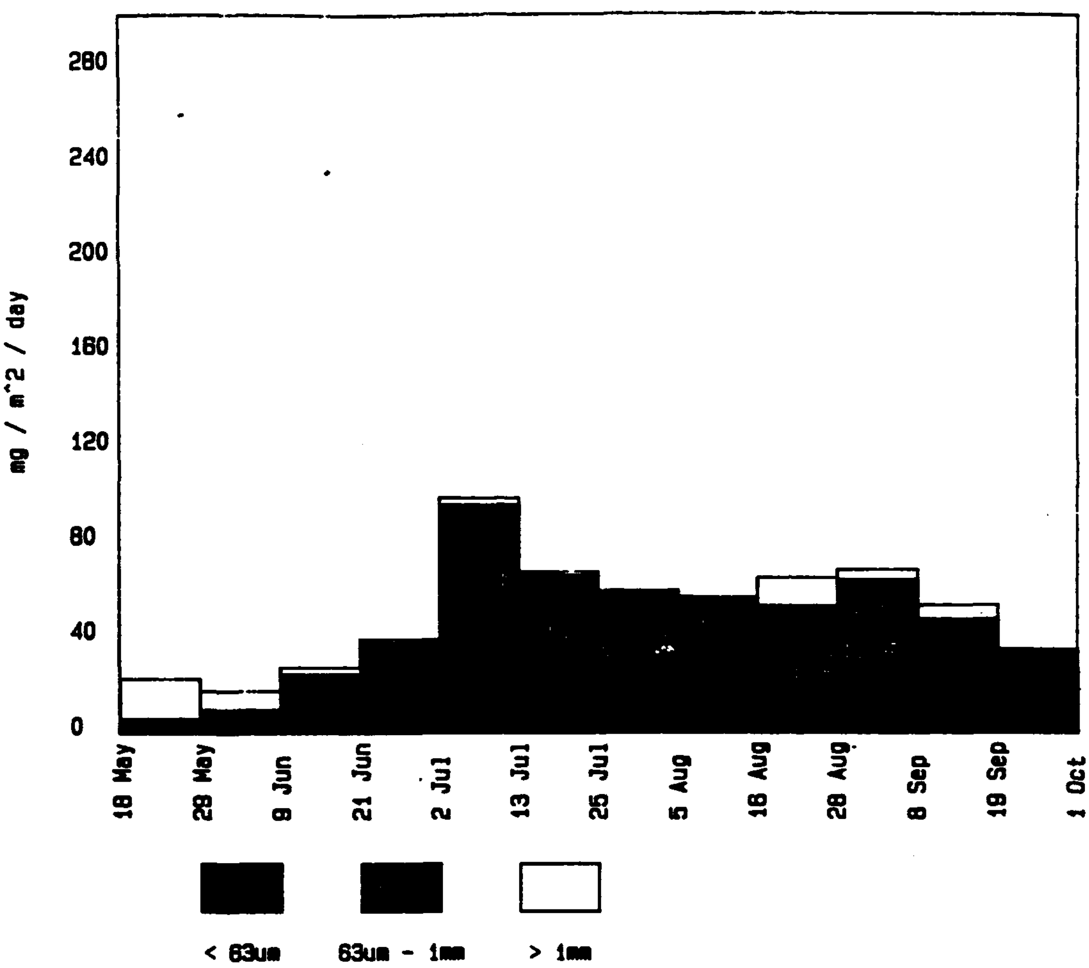
BLACK SEA II NON-COMBUSTIBLE FLUX AT 1200m



Black Sea 2 each cup was open for 11.33.days.
Mark 5 trap open from May 18 1983 to Oct 1 1983 at 1200 meters.
NON COMBUSTIBLE FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	6.56	8.33	10.79	13.72	53.94	68.56	71.28	90.60
2	3.38	2.28	29.88	20.14	28.00	18.87	61.26	41.28
3	4.84	3.03	31.62	19.77	3.98	2.49	40.44	25.29
4	2.78	2.34	25.43	21.42	.99	.83	29.20	24.59
5	10.47	20.92	7.06	14.10	.48	.95	18.00	35.98
6	9.95	12.97	7.46	9.73	.34	.45	17.76	23.15
7	9.65	10.17	6.55	6.91	.20	.21	16.39	17.29
8	18.10	20.81	9.03	10.38	.58	.67	27.71	31.86
9	41.94	122.33	15.92	46.43			57.86	168.76
10	17.15	31.26	16.88	30.76	2.12	3.87	36.15	65.89
11	19.10	22.80	11.05	13.19	3.68	4.40	33.84	40.39
12	23.48	18.29	4.20	3.27			27.67	21.56

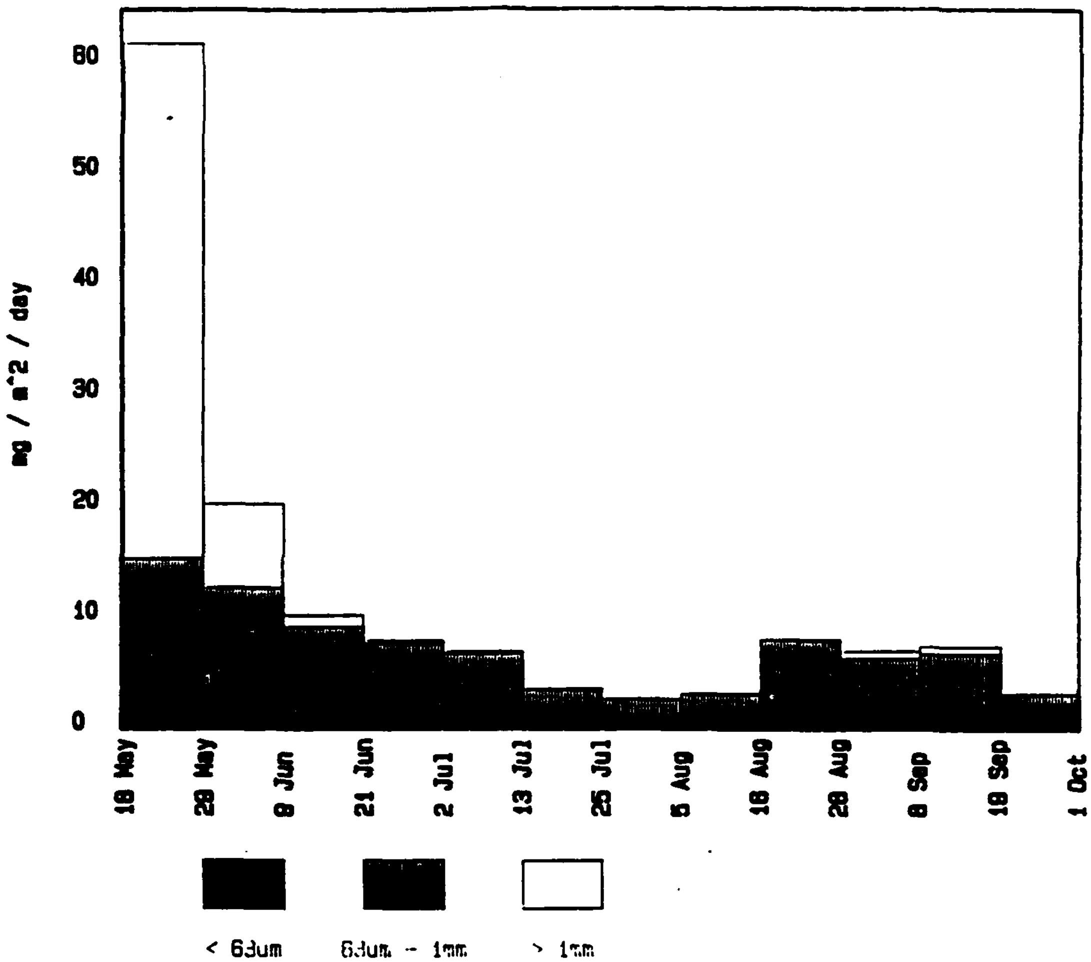
BLACK SEA II COMBUSTIBLE FLUX AT 1200m



Black Sea 2 each cup was open for 11.33.days.
Mark 5 trap open from May 18 1983 to Oct 1 1983 at 1200 meters.
Combustible Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	1.41	1.79	5.74	7.29	13.35	16.97	20.49	26.05
2	1.20	.81	14.32	9.65	11.70	7.88	27.22	18.34
3	3.52	2.20	37.12	23.21	4.47	2.79	45.11	28.20
4	3.65	3.07	46.01	38.74	1.72	1.45	51.38	43.26
5	27.48	54.93	21.65	43.28	1.42	2.84	50.55	101.05
6	26.14	34.08	25.77	33.59	1.15	1.50	53.05	69.17
7	29.04	30.64	27.53	29.04	.72	.76	57.30	60.44
8	28.02	32.21	21.20	24.37	1.21	1.39	50.43	57.98
9	4.92	14.35	13.68	39.91			22.74	66.33
10	15.19	27.69	20.81	37.92	2.31	4.22	38.31	69.83
11	23.85	28.47	16.58	19.79	4.89	5.84	45.32	54.10
12	37.77	29.42	7.68	5.98			45.45	35.41

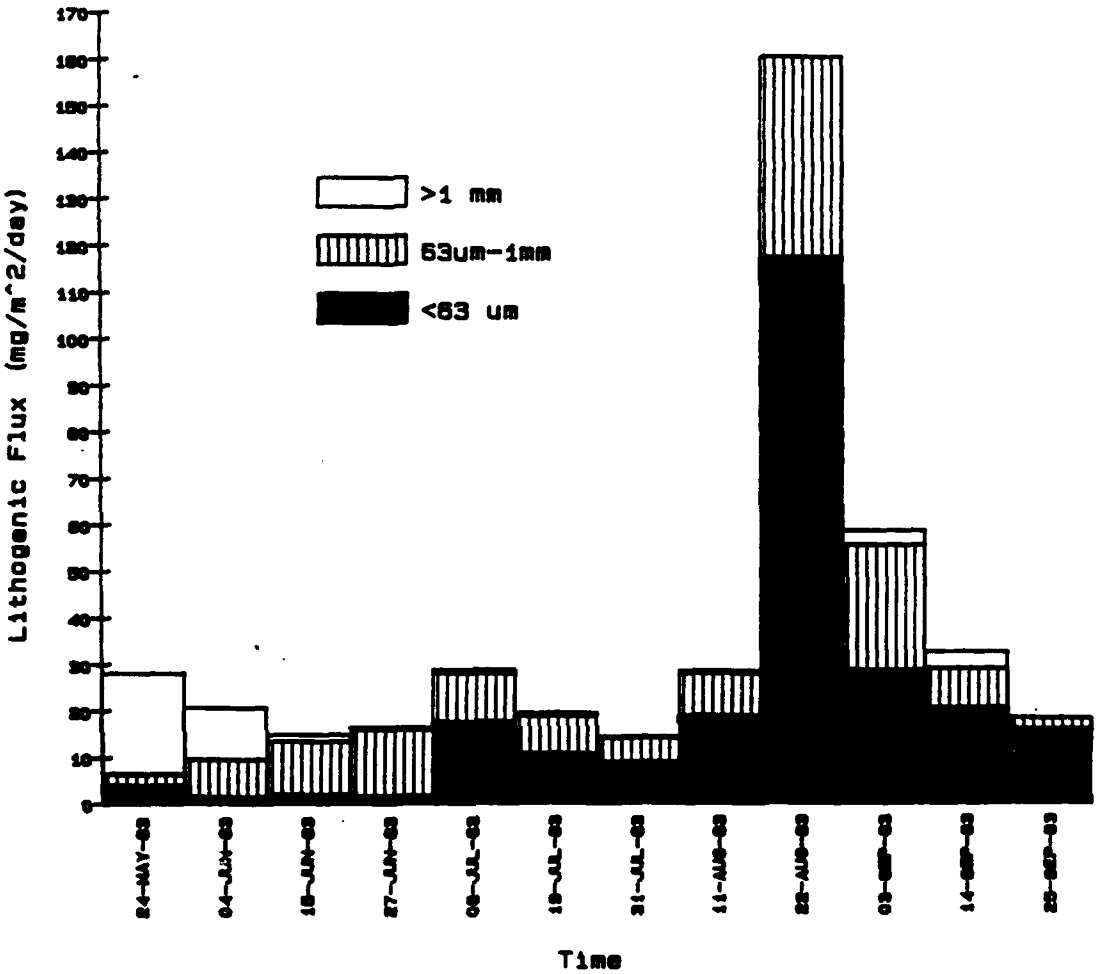
BLACK SEA 2 BIOGENIC SILICA FLUX AT 1200m



Black Sea 2 each cup was open for 11.33.days.
Mark 5 trap open from May 18 1983 to Oct 1 1983 at 1200 meters.
OPAL Flux
Ttl is Total Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	3.36	4.28	8.86	11.27	37.01	47.05	49.24	62.59
2	1.32	.89	17.77	11.98	11.40	7.68	30.49	20.55
3	1.66	1.04	13.21	8.26	1.67	1.05	16.55	10.35
4	.92	.78	8.29	6.98	.32	.27	9.53	8.03
5	1.61	3.22	1.83	3.67	.08	.15	3.52	7.03
6	1.65	2.15	1.15	1.49	0.00	0.00	2.79	3.64
7	1.07	1.13	1.52	1.60	0.00	0.00	2.59	2.73
8	1.65	1.89	1.14	1.31	0.00	0.00	2.79	3.20
9	1.63	4.76	1.16	3.39	.00	.00	2.79	8.13
10	1.42	2.59	2.12	3.87	.36	.65	3.90	7.10
11	1.77	2.12	3.98	4.75	.55	.65	6.30	7.52
12	2.90	2.26	1.20	.94	0.00	0.00	4.10	3.20

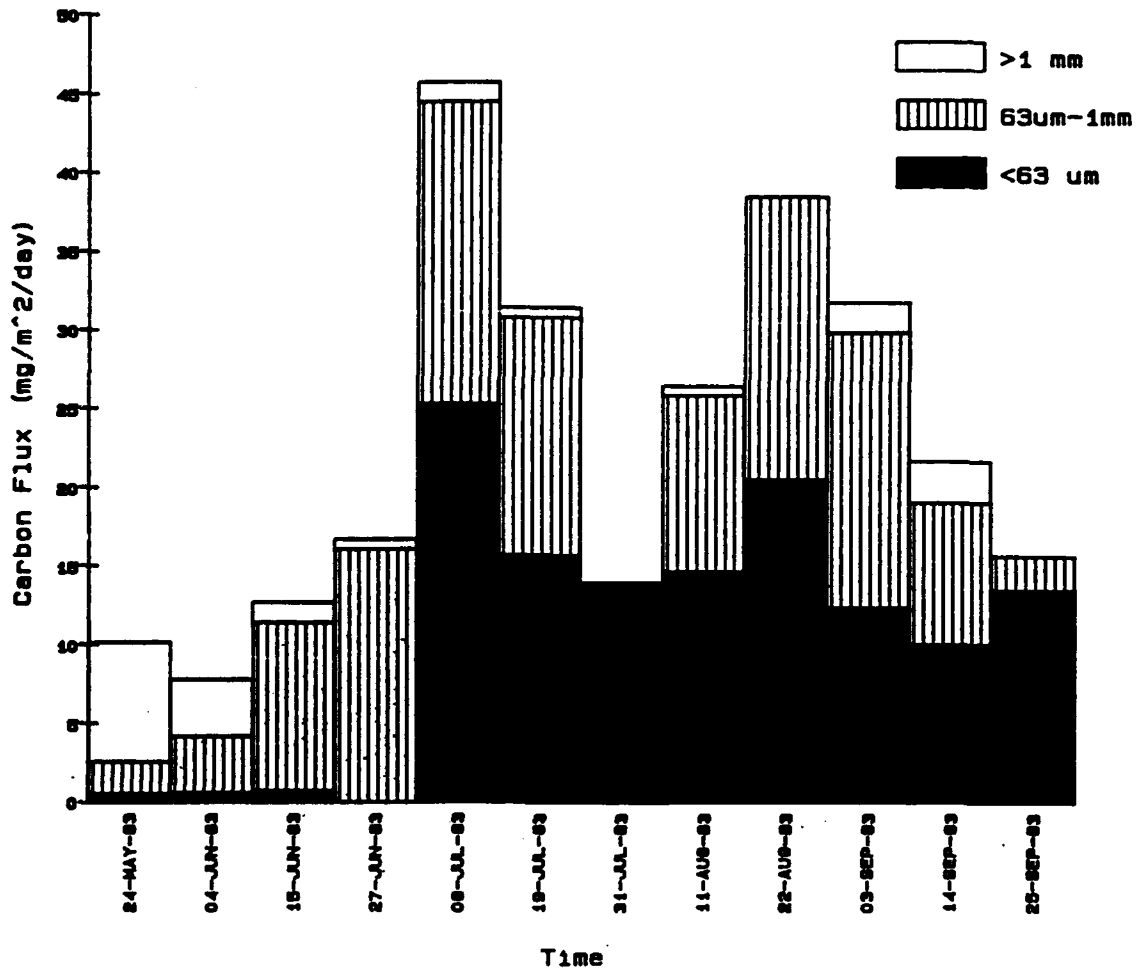
Lithogenic Flux at Black Sea 2, 1200 m, 1983



Sample I.D.	LITH <63	LITH<63 %ncmb.	LITH 63-1	LITH63-1 %ncmb.	LITH >1	LITH>1 %ncmb.	LITH total	LITH %total
BS2-1200-1	4.06	4.48	2.45	2.70	21.51	23.74	28.02	30.93
BS2-1200-2	1.39	3.37	8.16	19.77	11.19	27.11	20.74	50.24
BS2-1200-3	1.99	7.87	11.51	45.52	1.44	5.69	14.94	59.08
BS2-1200-4	1.56	6.34	14.44	58.73	0.56	2.28	16.56	67.35
BS2-1200-5	17.70	49.20	10.44	29.02	0.80	2.22	28.94	80.44
BS2-1200-6	10.83	46.78	8.24	35.60	0.45	1.94	19.52	84.33
BS2-1200-7	9.05	52.33	5.31	30.71	0.21	1.21	14.57	84.26
BS2-1200-8	18.92	59.39	9.07	28.47	0.67	2.10	28.66	89.97
BS2-1200-9	117.57	69.67	43.04	25.50	0.00	0.00	160.61	95.17
BS2-1200-10	28.67	43.51	26.90	40.82	3.22	4.89	58.79	89.22
BS2-1200-11	20.68	51.20	8.44	20.90	3.74	9.26	32.86	81.36
BS2-1200-12	16.03	74.35	2.33	10.81	0.00	0.00	18.36	85.16

Flux is in mg/m^2/day.

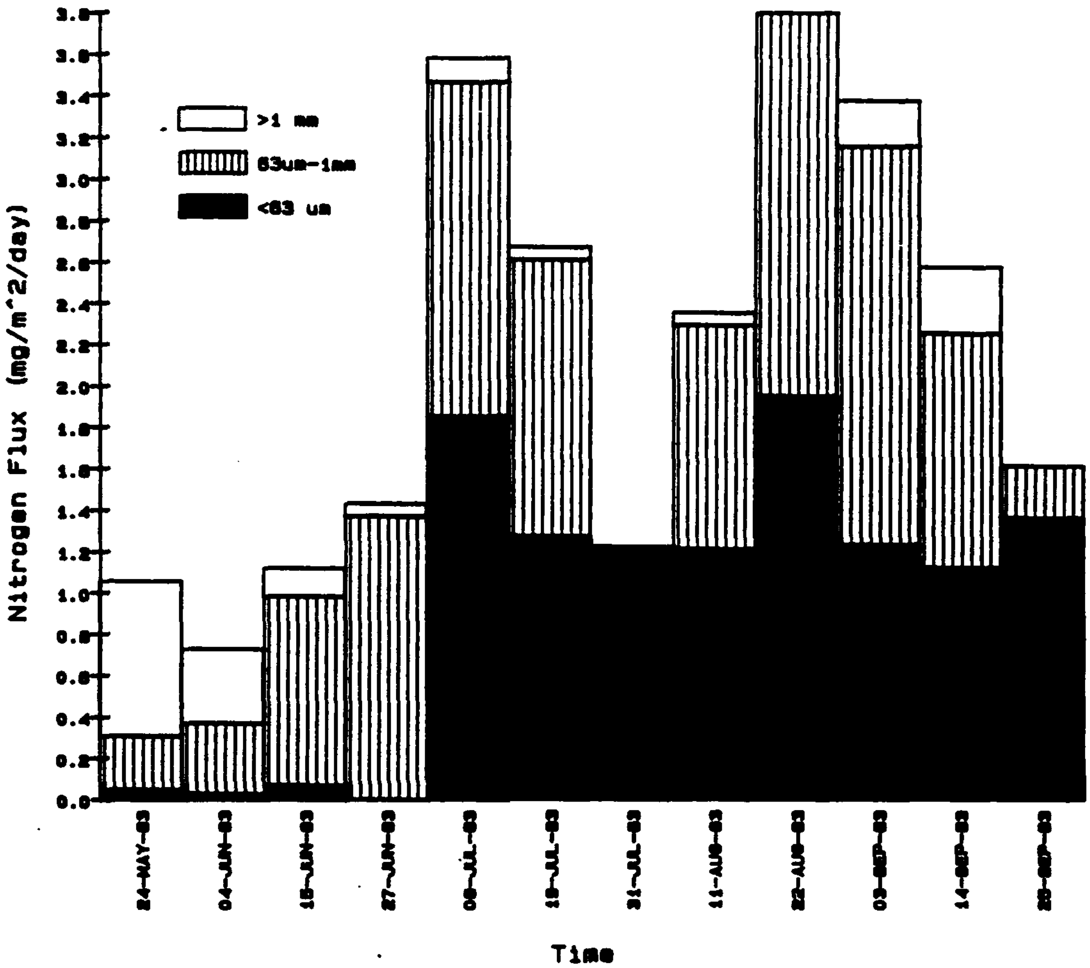
Carbon Flux at Black Sea 2, 1200 m, 1983



Black Sea 2 each cup was open for 11.33 days.
Mark 5 trap open from May 18 1983 to Oct 1 1983 at 1200 meters.
CARBON FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	.46	.59	1.58	2.01	5.98	7.60	8.02	10.20
2	.91	.62	5.33	3.59	5.37	3.62	11.62	7.83
3	1.21	.76	17.05	10.66	2.09	1.31	20.35	12.72
4	.00	.00	19.14	16.12	.80	.68	19.94	16.79
5	12.66	25.31	9.60	19.18	.64	1.29	22.90	45.78
6	12.03	15.69	11.59	15.11	.52	.68	24.15	31.48
7	13.19	13.91	13.08	13.80	.00	.00	26.27	27.71
8	12.74	14.65	9.77	11.23	.55	.63	23.07	26.52
9	7.03	20.50	6.17	18.00	.00	.00	13.20	38.50
10	6.77	12.33	9.62	17.54	1.05	1.91	17.44	31.78
11	8.39	10.01	7.55	9.02	2.23	2.66	18.17	21.69
12	17.27	13.46	2.78	2.16	.00	.00	20.05	15.62

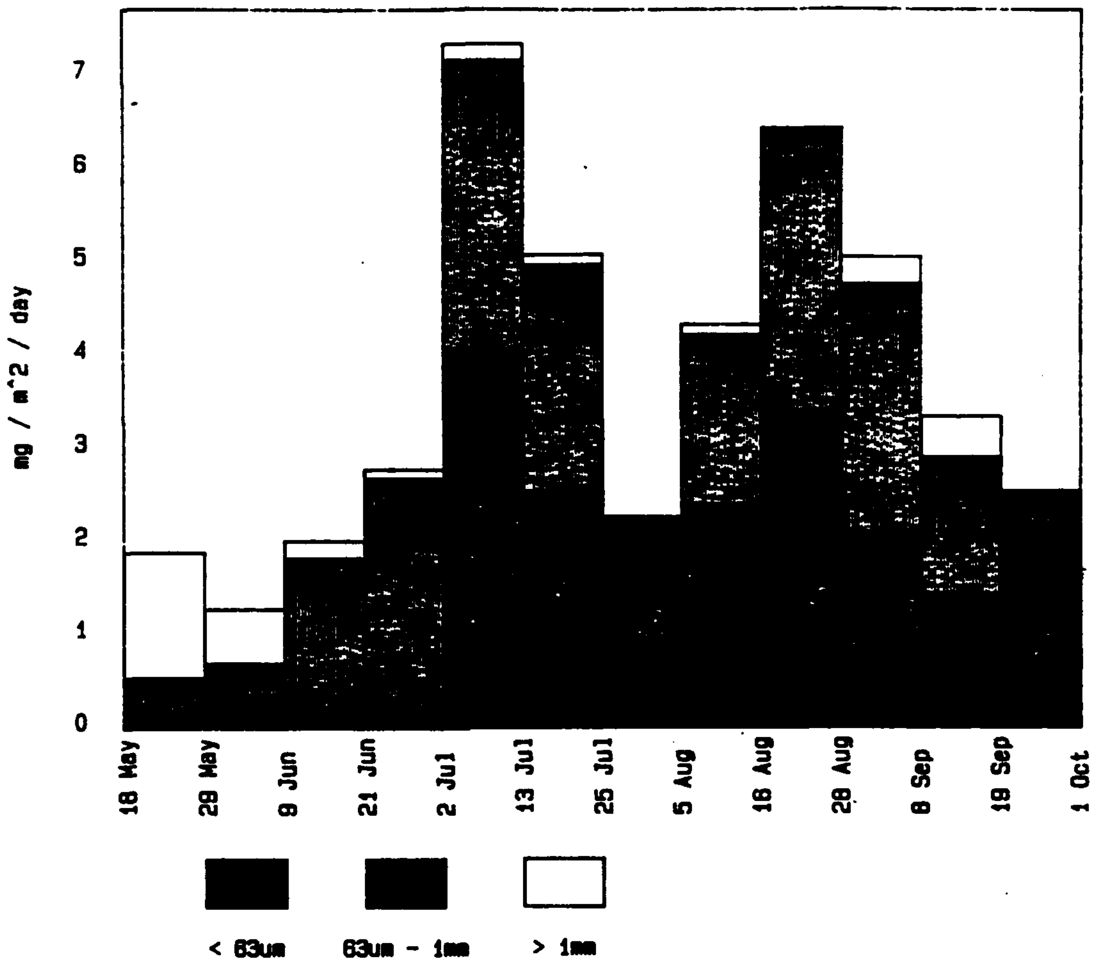
Nitrogen Flux at Black Sea 2, 1200 m, 1983



Black Sea II each cup was open for 11.33 days.
Mark 5 trap open from MAY 18 1983 to OCT 1 1983 at 1200 meters.
NITROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	.22	.05	1.12	.26	3.30	.75	4.64	1.06
2	.17	.03	1.93	.34	2.06	.36	4.16	.73
3	.25	.07	3.29	.91	.49	.14	4.03	1.11
4			3.45	1.37	.15	.06	3.61	1.43
5	1.85	1.85	1.61	1.61	.12	.12	3.57	3.57
6	1.86	1.27	1.96	1.34	.09	.06	3.90	2.67
7	2.02	1.22				.00	2.03	1.23
8	2.10	1.21	1.88	1.08	.11	.06	4.08	2.35
9	2.97	1.95	2.79	1.84	.00	.00	5.76	3.79
10	1.78	1.23	2.78	1.92	.32	.22	4.87	3.38
11	2.06	1.12	2.09	1.13	.59	.32	4.74	2.57
12	3.86	1.36	.70	.25	.00	.00	4.56	1.61

BLACK SEA II HYDROGEN FLUX AT 1200m



Black Sea II each cup was open for 11.33 days.
Mark 5 trap open from MAY 18 1983 to OCT 1 1983 at 1200 meters.
HYDROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	.55	.13	1.85	.42	5.99	1.37	8.40	1.92
2	.61	.11	3.40	.60	3.36	.59	7.37	1.30
3	.44	.12	6.29	1.73	.68	.19	7.41	2.04
4			6.89	2.73	.24	.10	7.14	2.82
5	4.11	4.11	3.16	3.16	.17	.17	7.44	7.44
6	3.75	2.57	3.61	2.47	.16	.11	7.53	5.15
7	3.79	2.29					3.80	2.30
8	4.23	2.44	3.20	1.85	.19	.11	7.62	4.39
9	5.25	3.46	4.66	3.07			9.91	6.53
10	3.08	2.13	3.90	2.70	.43	.30	7.40	5.13
11	2.69	1.46	2.75	1.49	.81	.44	6.25	3.39
12	6.29	2.22	1.01	.36			7.31	2.58

Experiment BS-3

Flux at 240 m and 1,158 m deep

October 15, 1983

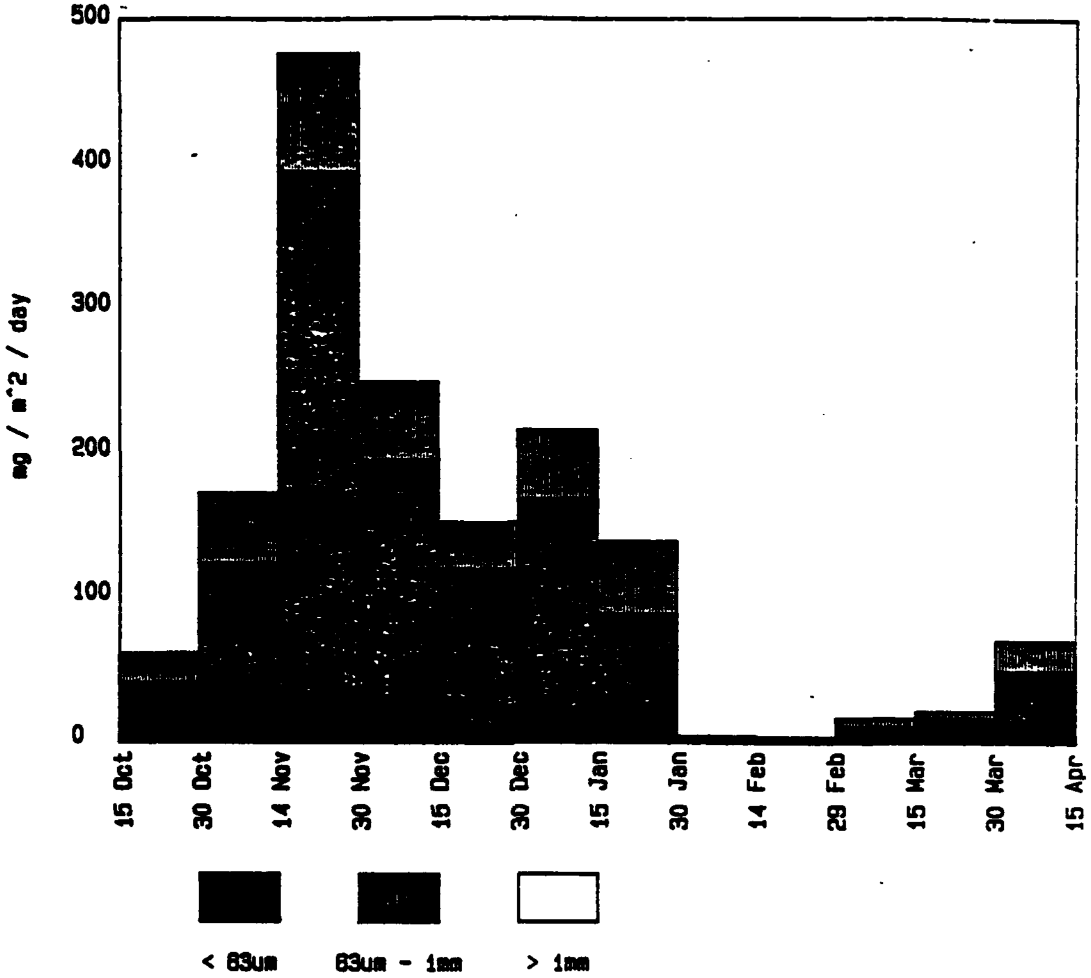
to

April 15, 1984

at

15.33 day intervals

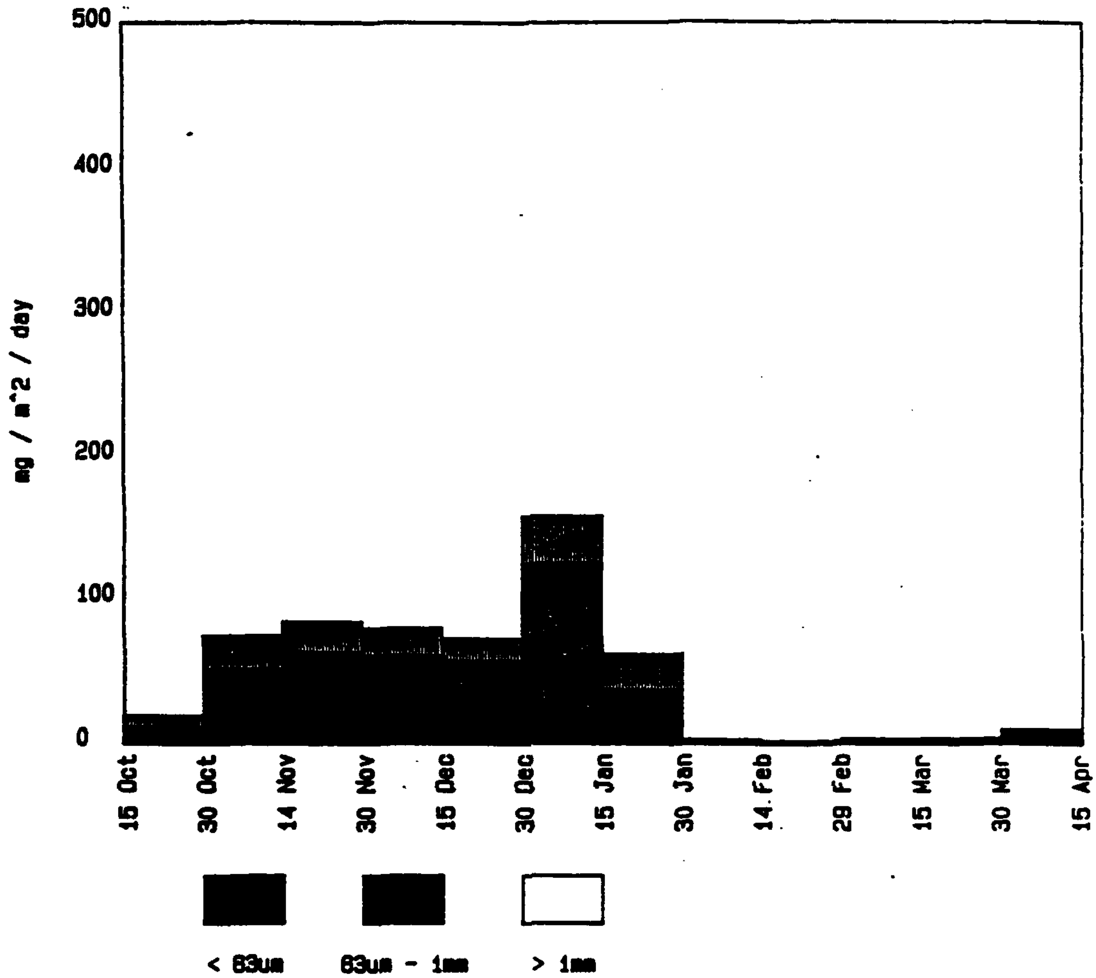
BLACK SEA 3 TOTAL FLUX AT 250m



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	67.18	42.17	32.82	20.60	.00	.00	100.00	62.77
2	72.00	126.34	28.00	49.13	.00	.00	100.00	175.47
3	82.92	401.89	17.08	82.80	.00	.00	100.00	484.69
4	78.41	198.91	21.59	54.78	.00	.00	100.00	253.69
5	78.86	122.39	21.14	32.80	.00	.00	100.00	155.19
6	78.10	171.57	21.90	48.11	.00	.00	100.00	219.68
7	63.97	90.46	36.03	50.95	.00	.00	100.00	141.41
8	71.17	3.16	28.83	1.28	.00	.00	100.00	4.44
9	72.02	2.78	27.98	1.08	.00	.00	100.00	3.86
10	65.06	11.32	34.94	6.08	.00	.00	100.00	17.40
11	78.15	17.20	21.85	4.81	.00	.00	100.00	22.01
12	70.63	50.53	29.37	21.01	.00	.00	100.00	71.54

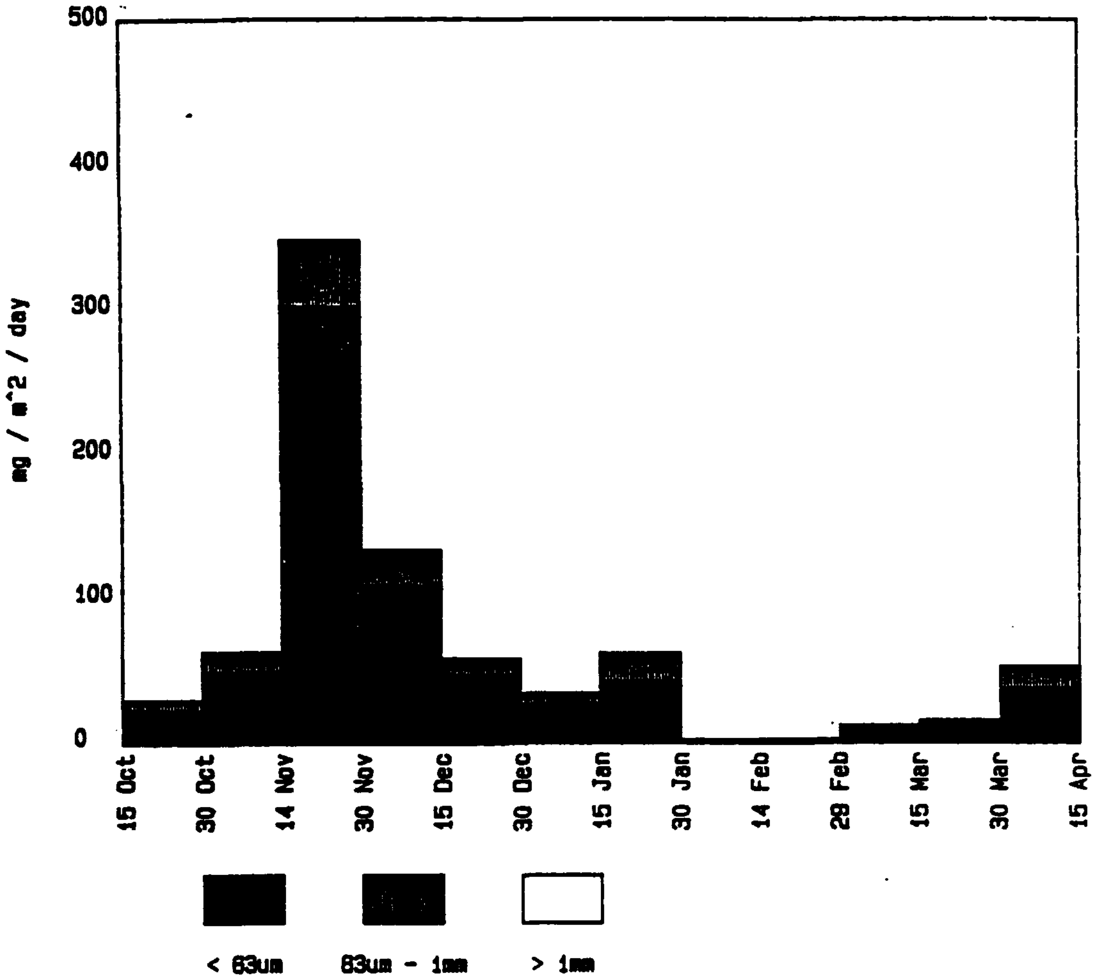
BLACK SEA 3 CARBONATE FLUX AT 250m



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
Carbonate Flux
Ttl is total Flux in all size classes

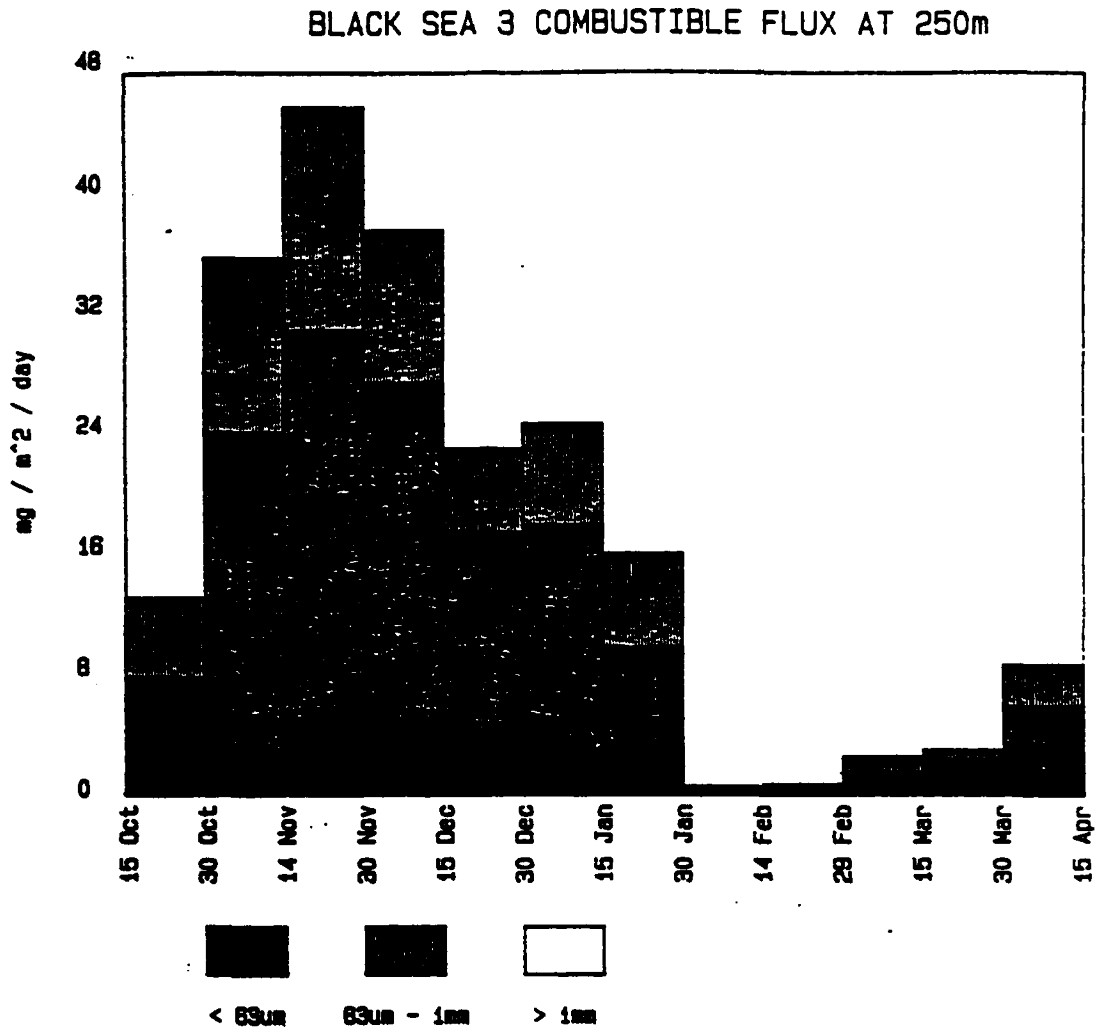
Cup #	< 63um % of Ttl	< 63um FLUX	63um - 1 % of Ttl	63um - 1 FLUX	> 1mm % of Ttl	> 1mm FLUX	TOTAL % of Ttl	TOTAL FLUX
1	18.44	11.57	12.72	7.99	0.00	0.00	31.16	19.56
2	29.76	52.22	13.41	23.53	0.00	0.00	43.17	75.75
3	13.25	64.23	4.38	21.25	0.00	0.00	17.64	85.48
4	24.31	61.68	7.58	19.24	0.00	0.00	31.90	80.92
5	37.29	57.87	10.03	15.56	0.00	0.00	47.31	73.43
6	57.68	126.71	15.30	33.62	0.00	0.00	72.98	160.33
7	26.68	37.73	17.69	25.01	0.00	0.00	44.37	62.75
8	39.49	1.75	14.17	.63	0.00	0.00	53.66	2.38
9	28.03	1.08	7.77	.30	0.00	0.00	35.80	1.38
10	11.36	1.98	6.96	1.21	0.00	0.00	18.33	3.19
11	12.85	2.83	3.96	.87	0.00	0.00	16.81	3.70
12	9.72	6.96	4.38	3.13	0.00	0.00	14.10	10.09

BLACK SEA 3 NON-COMBUSTIBLE FLUX AT 250m



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
NON COMBUSTIBLE FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

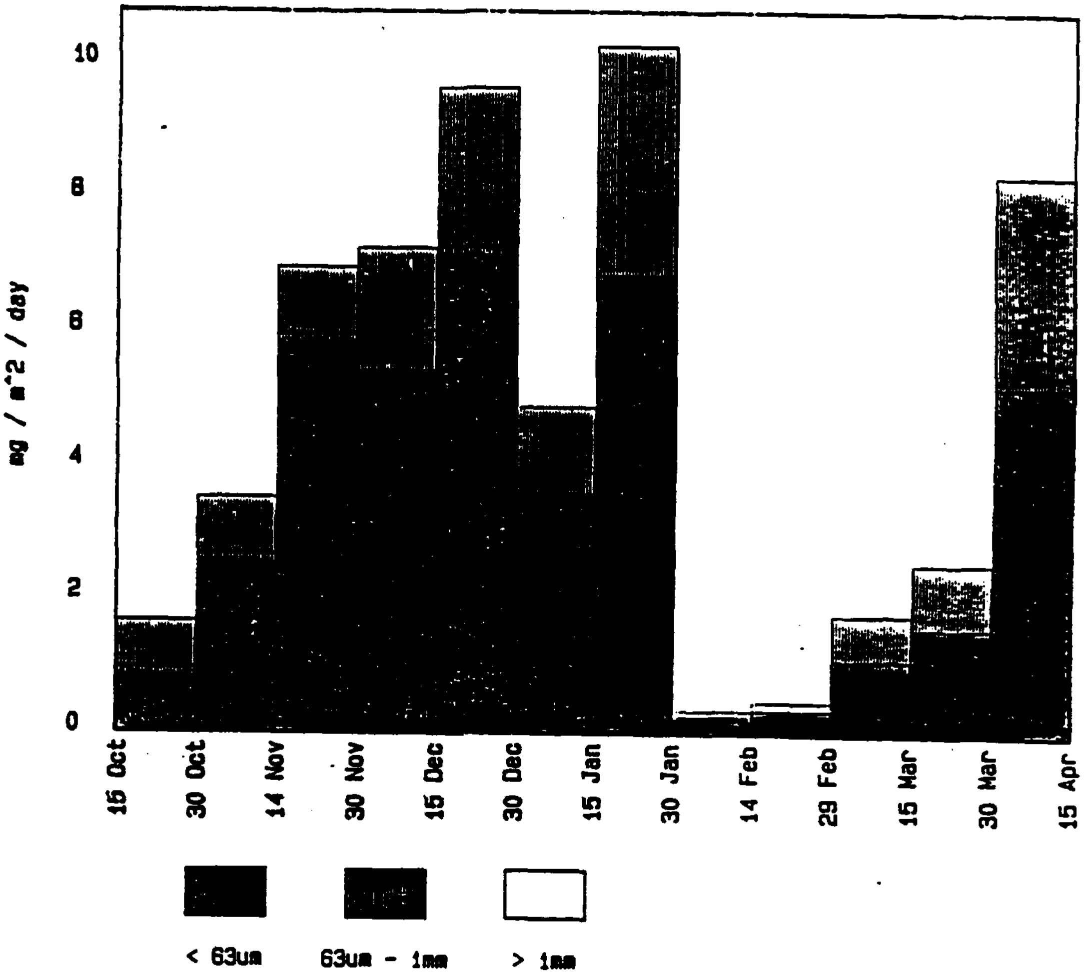
Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	36.28	22.77	11.65	7.31	0.00	0.00	47.93	30.08
2	28.42	49.87	7.92	13.89	0.00	0.00	36.34	63.76
3	63.25	306.56	9.65	46.75	0.00	0.00	72.89	353.31
4	43.24	109.69	9.98	25.31	0.00	0.00	53.22	135.00
5	30.30	47.03	7.51	11.66	0.00	0.00	37.81	58.68
6	12.23	26.86	3.51	7.71	0.00	0.00	15.74	34.57
7	30.36	42.93	13.91	19.67	0.00	0.00	44.27	62.60
8	24.64	1.09	9.97	.44	0.00	0.00	34.61	1.54
9	32.85	1.27	14.20	.55	0.00	0.00	47.05	1.82
10	45.42	7.90	21.76	3.79	0.00	0.00	67.18	11.69
11	54.78	12.06	14.92	3.28	0.00	0.00	69.70	15.34
12	52.71	37.71	21.17	15.15	0.00	0.00	73.88	52.86



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
Combustible Flux
Ttl is total Flux in all size classes

Cup #	< 63um % of Ttl	< 63um FLUX	63um - 1 % of Ttl	63um - 1 FLUX	> 1mm % of Ttl	> 1mm FLUX	TOTAL % of Ttl	TOTAL FLUX
1	12.46	7.82	8.45	5.30	0.00	0.00	20.91	13.12
2	13.82	24.24	6.68	11.71	0.00	0.00	20.49	35.96
3	6.42	31.10	3.05	14.80	0.00	0.00	9.47	45.90
4	10.86	27.54	4.03	10.23	0.00	0.00	14.89	37.77
5	11.28	17.50	3.60	5.58	0.00	0.00	14.87	23.08
6	8.19	18.00	3.09	6.79	0.00	0.00	11.28	24.79
7	6.93	9.80	4.43	6.27	0.00	0.00	11.36	16.07
8	7.04	.31	4.69	.21	0.00	0.00	11.73	.52
9	11.14	.43	6.01	.23	0.00	0.00	17.15	.66
10	8.27	1.44	6.22	1.08	0.00	0.00	14.49	2.52
11	10.52	2.32	2.97	.65	0.00	0.00	13.49	2.97
12	8.20	5.86	3.82	2.73	0.00	0.00	12.01	8.59

BLACK SEA 3 BIOGENIC SILICA FLUX AT 250m



BLACK SEA 3 250M

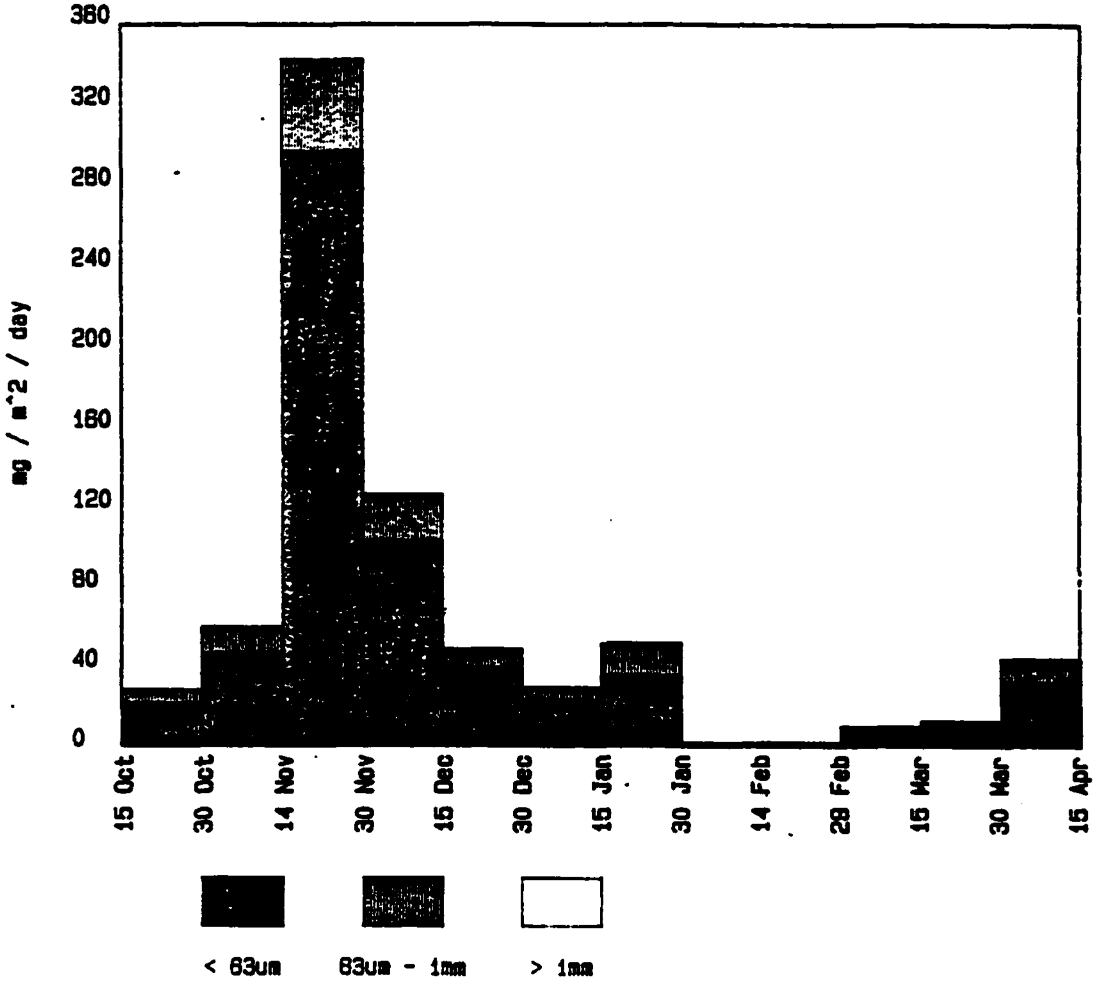
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.

OPAL Flux

Ttl is Total Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	1.56	.98	1.12	.70	0.00	0.00	2.68	1.68
2	1.55	2.71	.49	.86	0.00	0.00	2.04	3.57
3	1.25	6.06	.21	1.01	0.00	0.00	1.46	7.07
4	2.16	5.49	.74	1.87	0.00	0.00	2.90	7.36
5	4.76	7.38	1.55	2.40	0.00	0.00	6.30	9.78
6	1.66	3.64	.60	1.31	0.00	0.00	2.25	4.95
7	4.91	6.94	2.45	3.46	0.00	0.00	7.36	10.41
8	5.97	.27	2.02	.09	0.00	0.00	8.00	.35
9	9.35	.36	3.34	.13	0.00	0.00	12.69	.49
10	6.44	1.12	3.89	.68	0.00	0.00	10.33	1.80
11	7.25	1.60	4.46	.98	0.00	0.00	11.71	2.58
12	7.37	5.27	4.48	3.21	0.00	0.00	11.85	8.48

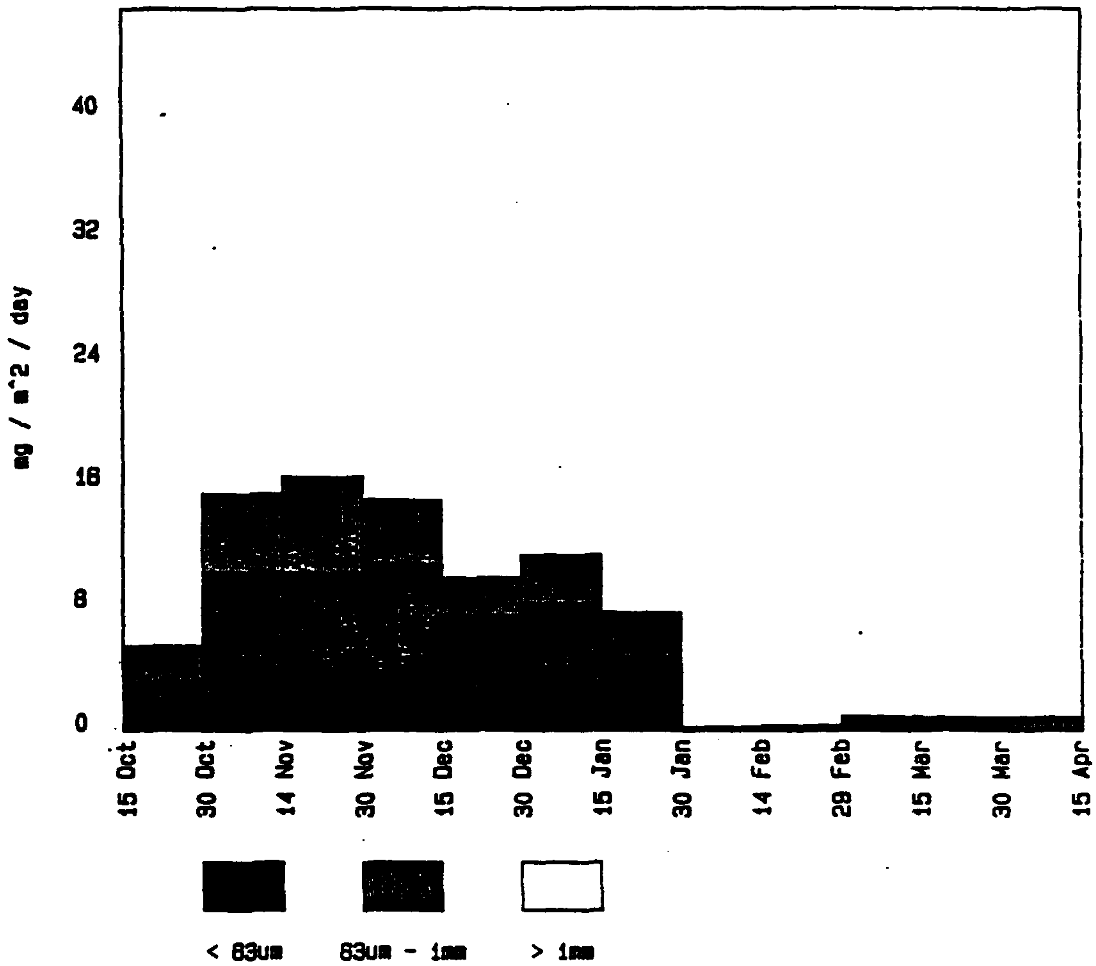
BLACK SEA 3 LITHOGENIC FLUX AT 250m



Sample I.D.	LITH <63	LITH<63 %total	LITH 63-1	LITH63-1 %total	LITH total	LITHtot. %total
BS3-250-1*	21.88	34.86	6.61	10.53	28.49	45.39
BS3-250-2*	47.16	26.88	13.03	7.43	60.19	34.30
BS3-250-3*	300.50	62.00	45.74	9.44	346.24	71.44
BS3-250-4*	104.20	41.07	23.45	9.24	127.65	50.32
BS3-250-5*	39.64	25.55	9.26	5.97	48.90	31.51
BS3-250-6*	23.22	10.57	6.40	2.91	29.62	13.48
BS3-250-7*	35.69	25.44	16.21	11.46	52.19	36.91
BS3-250-8*	0.83	18.67	0.35	7.94	1.18	26.61
BS3-250-9*	0.91	23.50	0.42	10.86	1.33	34.36
BS3-250-10*	6.78	38.98	3.11	17.87	9.89	56.85
BS3-250-11*	10.46	47.52	2.30	10.46	12.76	57.99
BS3-250-12*	32.44	45.34	11.94	16.69	44.38	62.03

Flux is in mg/m^2/day.

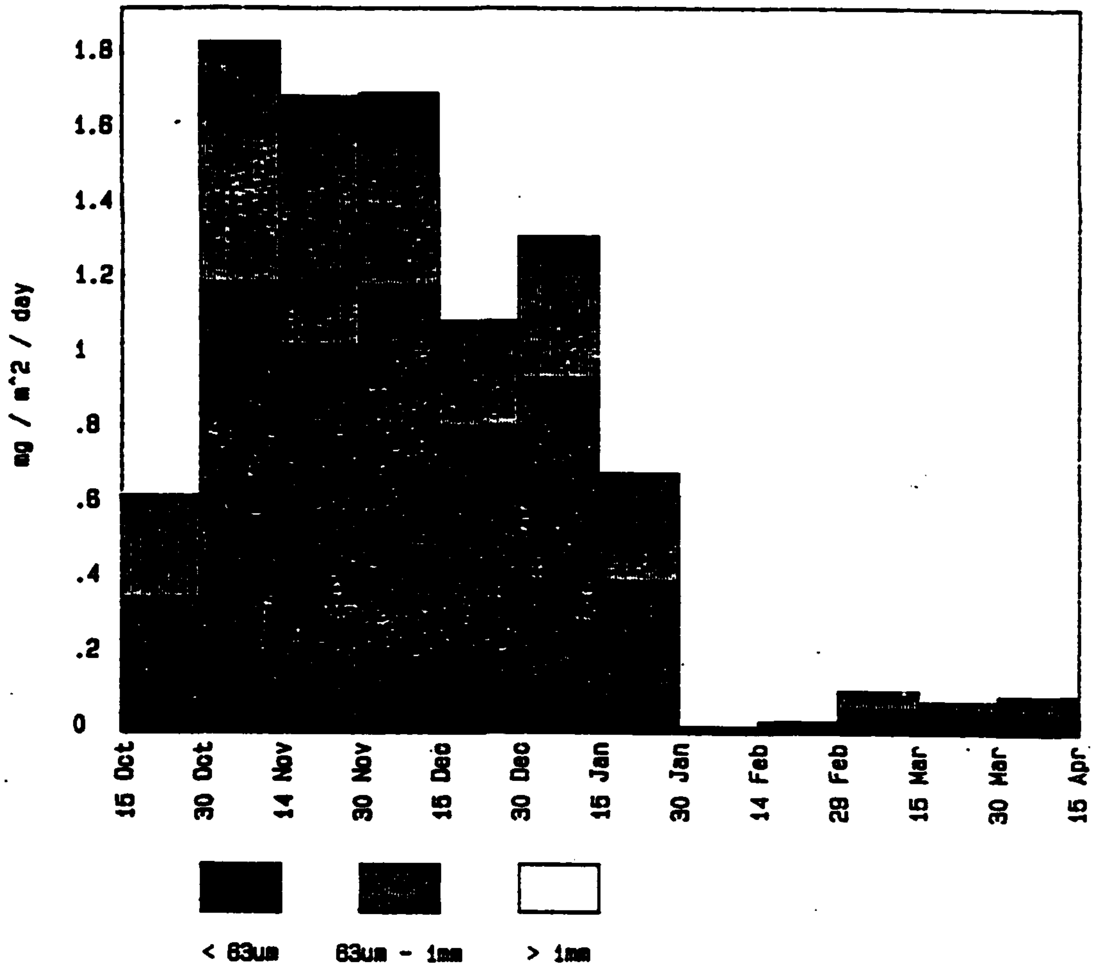
BLACK SEA 3 CARBON FLUX AT 250m



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
CARBON FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	24.15	3.17	17.69	2.32	0.00	0.00	41.84	5.49
2	28.82	10.36	14.34	5.16	0.00	0.00	43.16	15.52
3	22.44	10.30	13.81	6.34	0.00	0.00	36.25	16.64
4	28.70	10.84	11.24	4.25	0.00	0.00	39.95	15.09
5	32.37	7.47	10.60	2.45	0.00	0.00	42.97	9.92
6	33.34	8.26	12.82	3.18	0.00	0.00	46.16	11.44
7	29.20	4.69	18.37	2.95	0.00	0.00	47.57	7.64
8	25.58	.13			0.00	0.00	25.59	.13
9	27.37	.18	15.28	.10	0.00	0.00	42.65	.28
10	19.34	.49	15.64	.39	0.00	0.00	34.98	.88
11	20.57	.61	7.39	.22	0.00	0.00	27.96	.83
12			9.71	.83	0.00	0.00	9.76	.84

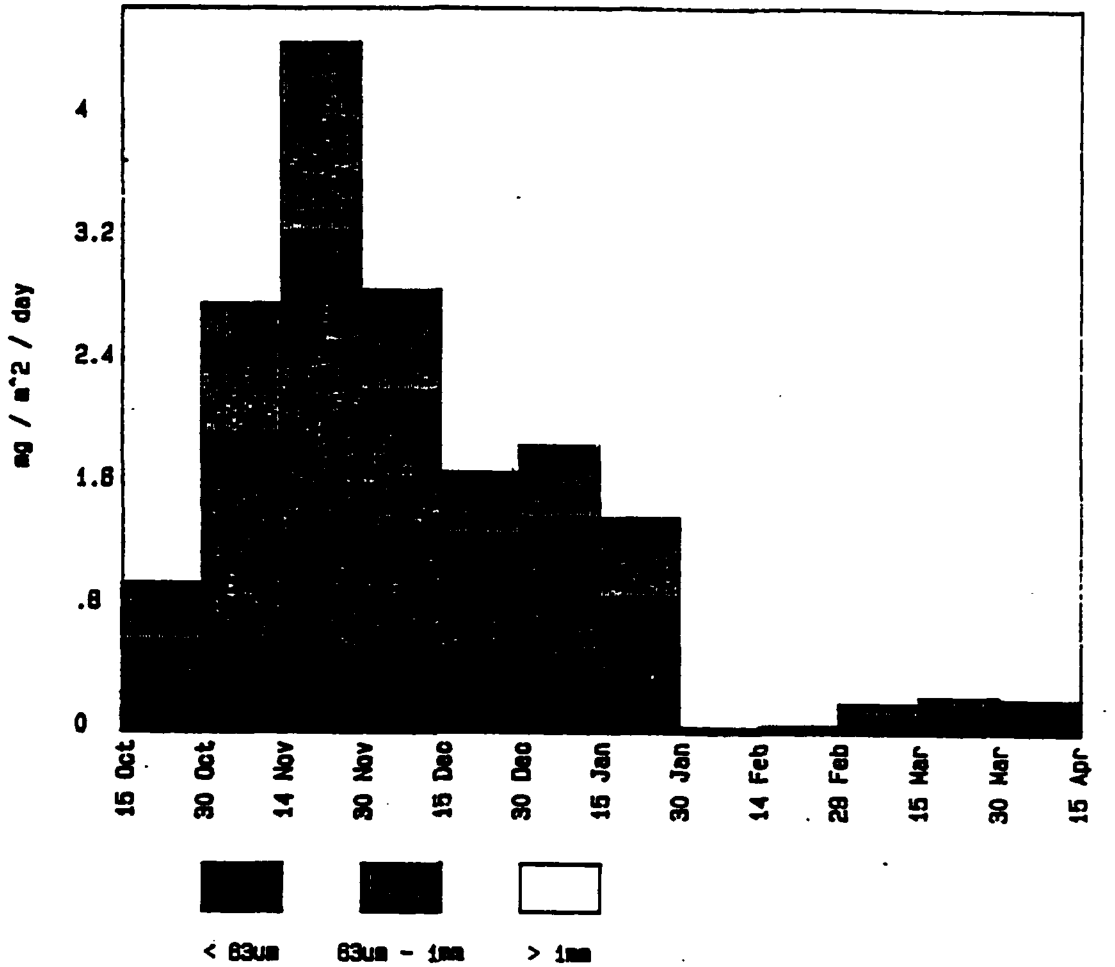
BLACK SEA 3 NITROGEN FLUX AT 250m



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
NITROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	2.75	.36	2.10	.28	0.00	0.00	4.86	.64
2	3.38	1.22	1.80	.65	0.00	0.00	5.18	1.86
3	2.28	1.05	1.46	.67	0.00	0.00	3.74	1.72
4	3.20	1.21	1.37	.52	0.00	0.00	4.57	1.73
5	3.58	.83	1.23	.28	0.00	0.00	4.81	1.11
6	3.86	.96	1.54	.38	0.00	0.00	5.40	1.34
7	2.53	.41	1.81	.29	0.00	0.00	4.33	.70
8	2.75	.01					2.77	.01
9	2.87	.02	1.57	.01	0.00	0.00	4.44	.03
10	2.59	.07	1.87	.05	0.00	0.00	4.47	.11
11	2.03	.06	.78	.02	0.00	0.00	2.82	.08
12			1.10	.09	0.00	0.00	1.15	.10

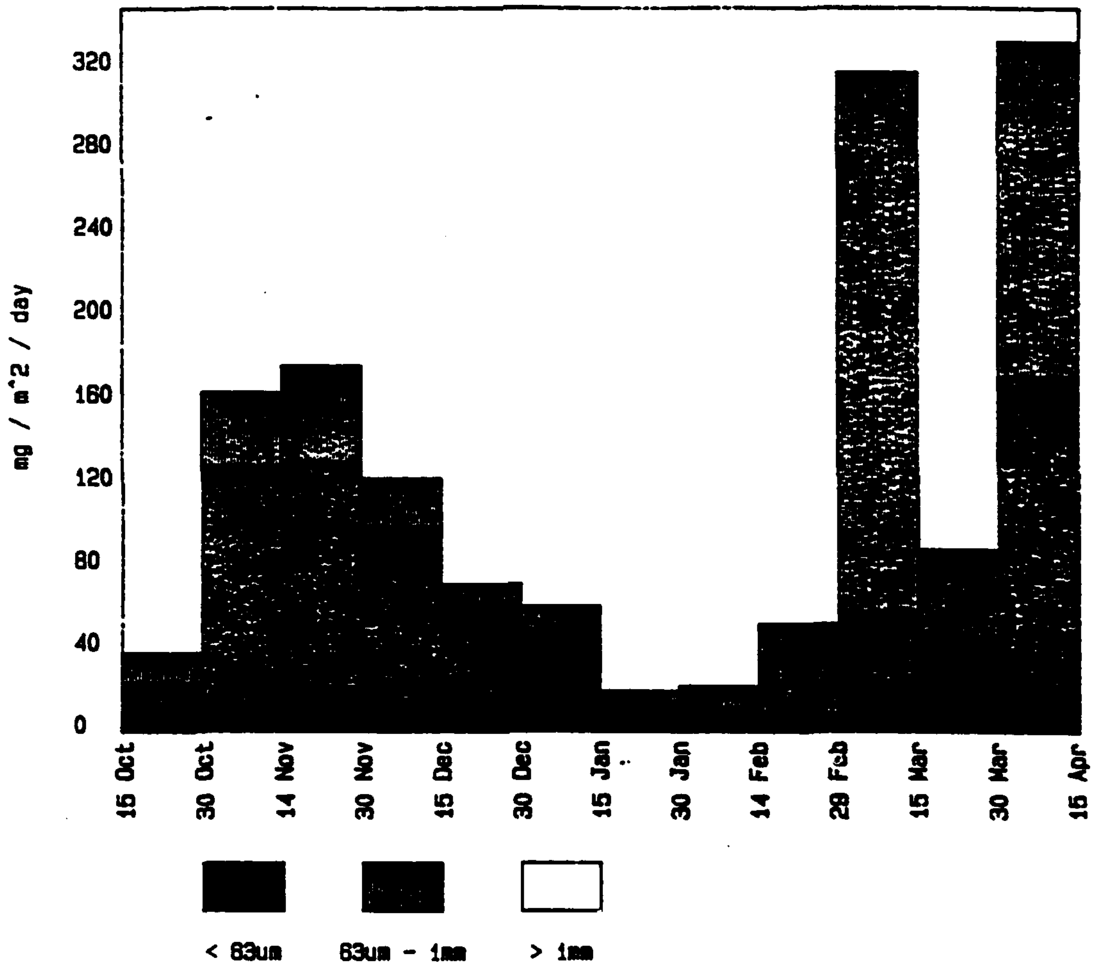
BLACK SEA 3 HYDROGEN FLUX AT 250m



BLACK SEA 3 250M
Mark 5 trap open from OCT 15 1983 to APR 15 1984 at 250 meters.
HYDROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

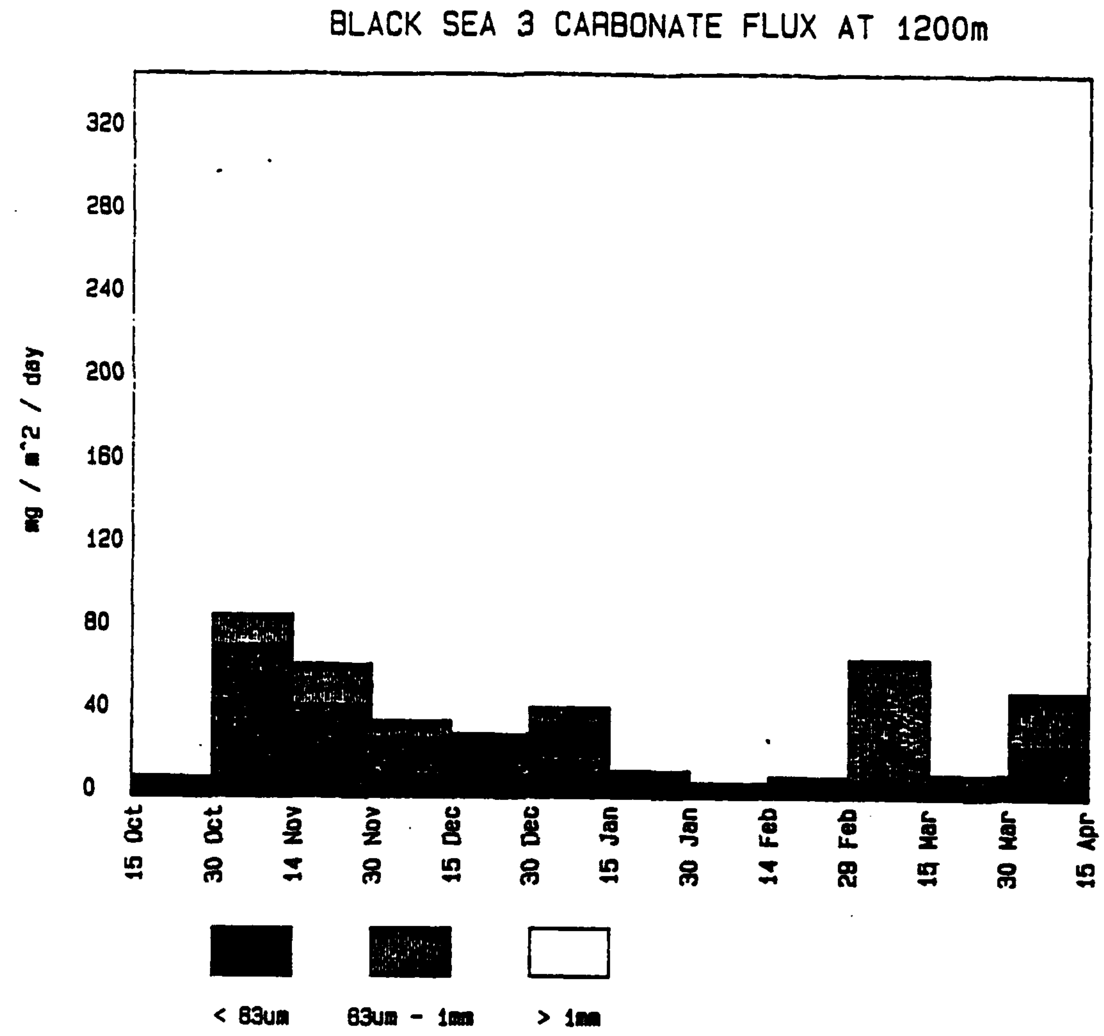
Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	4.55	.60	2.87	.38	0.00	0.00	7.42	.97
2	5.48	1.97	2.38	.86	0.00	0.00	7.86	2.83
3	7.21	3.31	2.67	1.22	0.00	0.00	9.88	4.53
4	5.[illegible]	2.25	1.75	.66	0.00	0.00	7.71	2.91
5	5.[illegible]	1.30	1.78	.41	0.00	0.00	7.40	1.71
6	5.68	1.41	1.91	.47	0.00	0.00	7.60	1.88
7	5.51	.89	3.24	.52	0.00	0.00	8.76	1.41
8	5.51	.03			0.00	0.00	5.52	.03
9	4.51	.03	2.43	.02	0.00	0.00	6.94	.05
10	4.59	.12	3.01	.08	0.00	0.00	7.61	.19
11	6.15	.18	1.82	.05	0.00	0.00	7.96	.24
12			2.50	.21	0.00	0.00	2.54	.22

BLACK SEA 3 TOTAL FLUX AT 1200m



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

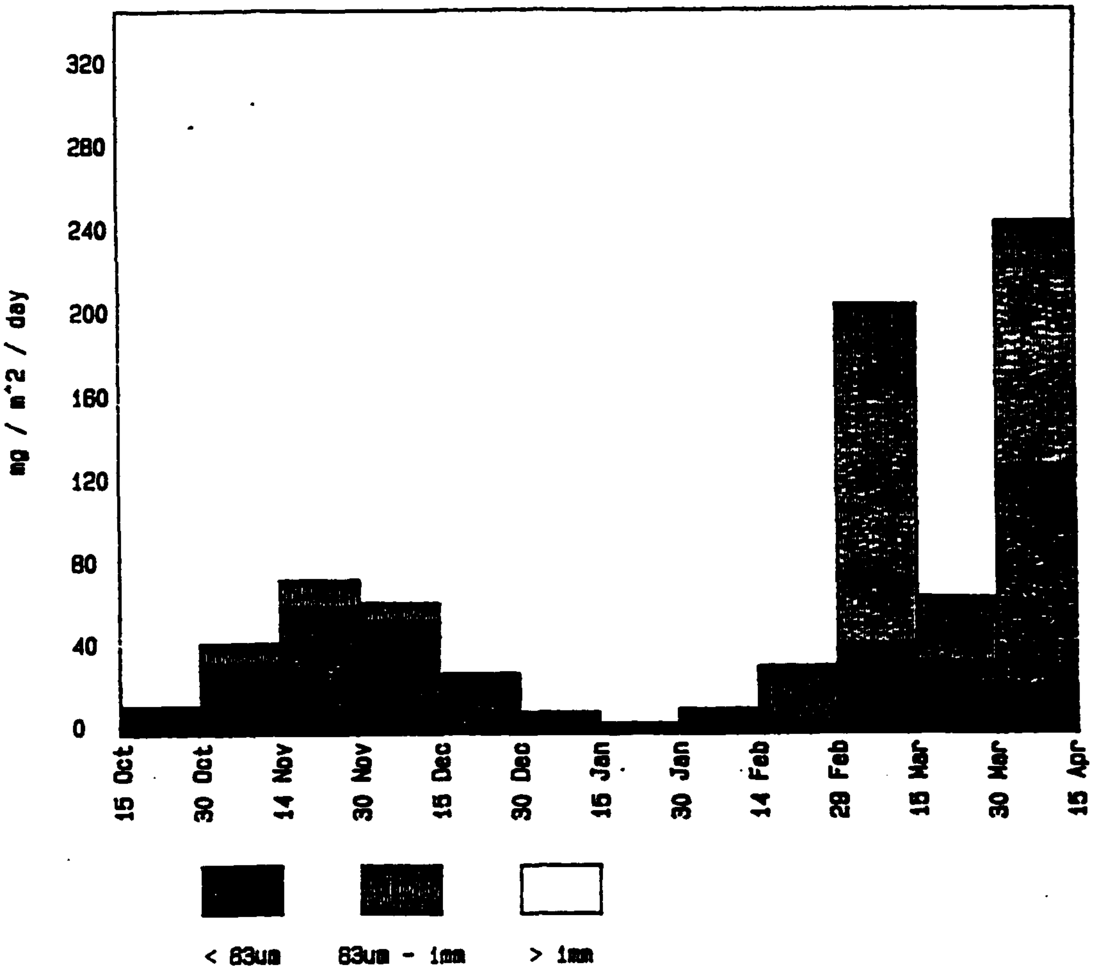
Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	62.38	23.73	37.62	14.31	0.00	0.00	100.00	38.04
2	78.55	130.12	21.45	35.54	0.00	0.00	100.00	165.66
3	73.94	132.05	26.06	46.54	0.00	0.00	100.00	178.59
4	81.16	100.40	18.84	23.30	0.00	0.00	100.00	123.70
5	87.98	63.15	12.02	8.63	0.00	0.00	100.00	71.78
6	80.93	49.27	19.07	11.61	0.00	0.00	100.00	60.88
7	74.27	14.43	25.73	5.00	0.00	0.00	100.00	19.43
8	53.85	11.76	46.15	10.08	0.00	0.00	100.00	21.84
9	16.39	8.58	83.61	43.77	0.00	0.00	100.00	52.35
10	18.22	58.57	81.78	262.89	0.00	0.00	100.00	321.46
11	52.29	46.31	47.71	42.44	0.00	0.00	100.00	88.95
12	51.60	173.53	48.40	162.75	0.00	0.00	100.00	336.28



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
Carbonate Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	15.98	6.08	8.48	3.23	0.00	0.00	24.46	9.30
2	44.43	73.60	9.06	15.00	0.00	0.00	53.48	88.60
3	24.87	44.42	11.10	19.83	0.00	0.00	35.97	64.24
4	22.80	28.20	6.77	8.37	0.00	0.00	29.57	36.57
5	37.44	26.88	4.85	3.48	0.00	0.00	42.30	30.36
6	58.15	35.40	12.61	7.68	0.00	0.00	70.77	43.08
7	47.67	9.26	16.41	3.19	0.00	0.00	64.09	12.45
8	16.30	3.56	14.17	3.09	0.00	0.00	30.47	6.65
9	3.63	1.90	14.96	7.83	0.00	0.00	18.59	9.73
10	2.31	7.42	18.54	59.60	0.00	0.00	20.85	67.02
11	6.64	5.91	5.84	5.20	0.00	0.00	12.49	11.11
12	7.38	24.81	7.76	26.09	0.00	0.00	15.14	50.91

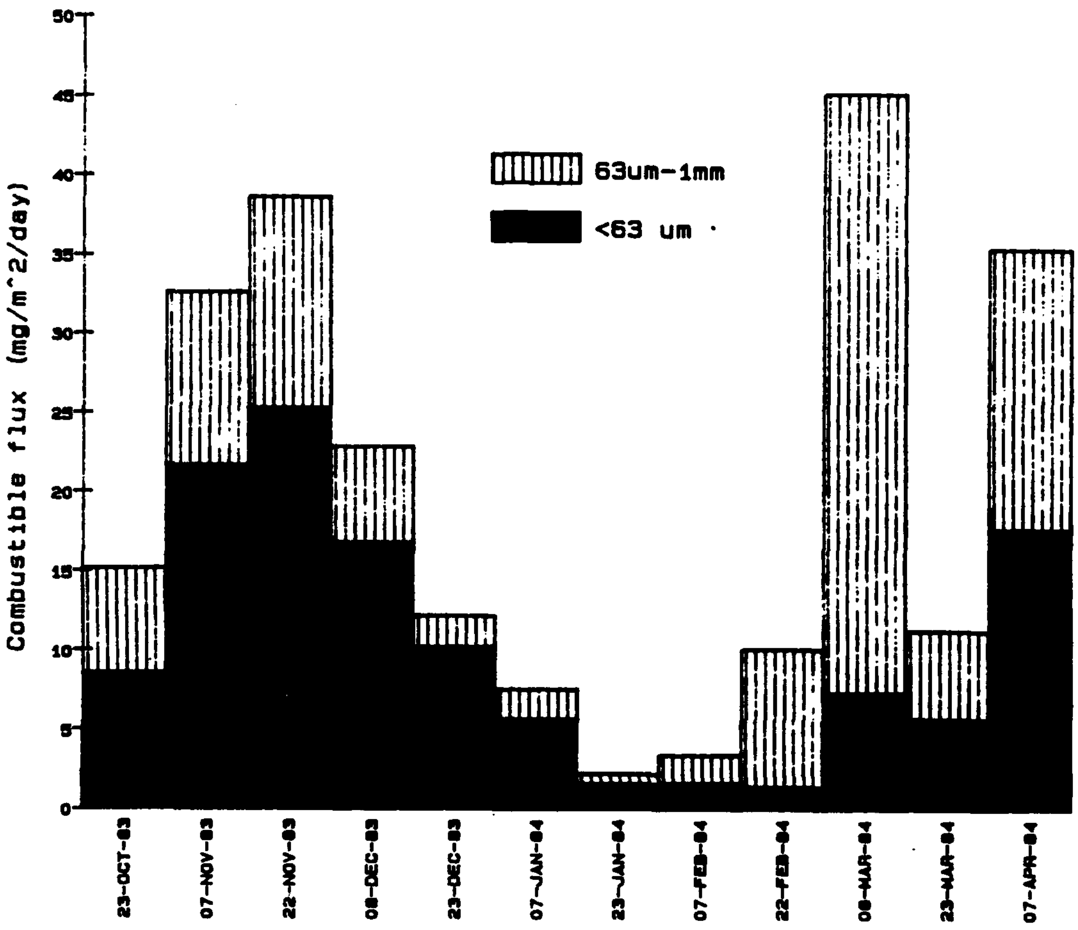
BLACK SEA 3 NON-COMBUSTIBLE FLUX AT 1200m



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
NON COMBUSTIBLE FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	23.89	9.09	11.73	4.46	0.00	0.00	35.62	13.55
2	21.00	34.79	5.81	9.62	0.00	0.00	26.81	44.41
3	34.89	62.32	7.49	13.38	0.00	0.00	42.38	75.69
4	44.79	55.40	7.16	8.86	0.00	0.00	51.95	64.26
5	36.30	26.05	4.42	3.17	0.00	0.00	40.71	29.22
6	13.48	8.21	3.37	2.05	0.00	0.00	16.85	10.26
7	18.39	3.57	5.96	1.16	0.00	0.00	24.36	4.73
8	29.92	6.53	23.84	5.21	0.00	0.00	53.76	11.74
9	10.07	5.27	52.07	27.26	0.00	0.00	62.13	32.53
10	13.63	43.81	51.48	165.48	0.00	0.00	65.10	209.29
11	39.21	34.87	35.58	31.65	0.00	0.00	74.79	66.52
12	38.95	130.98	35.38	118.97	0.00	0.00	74.33	249.95

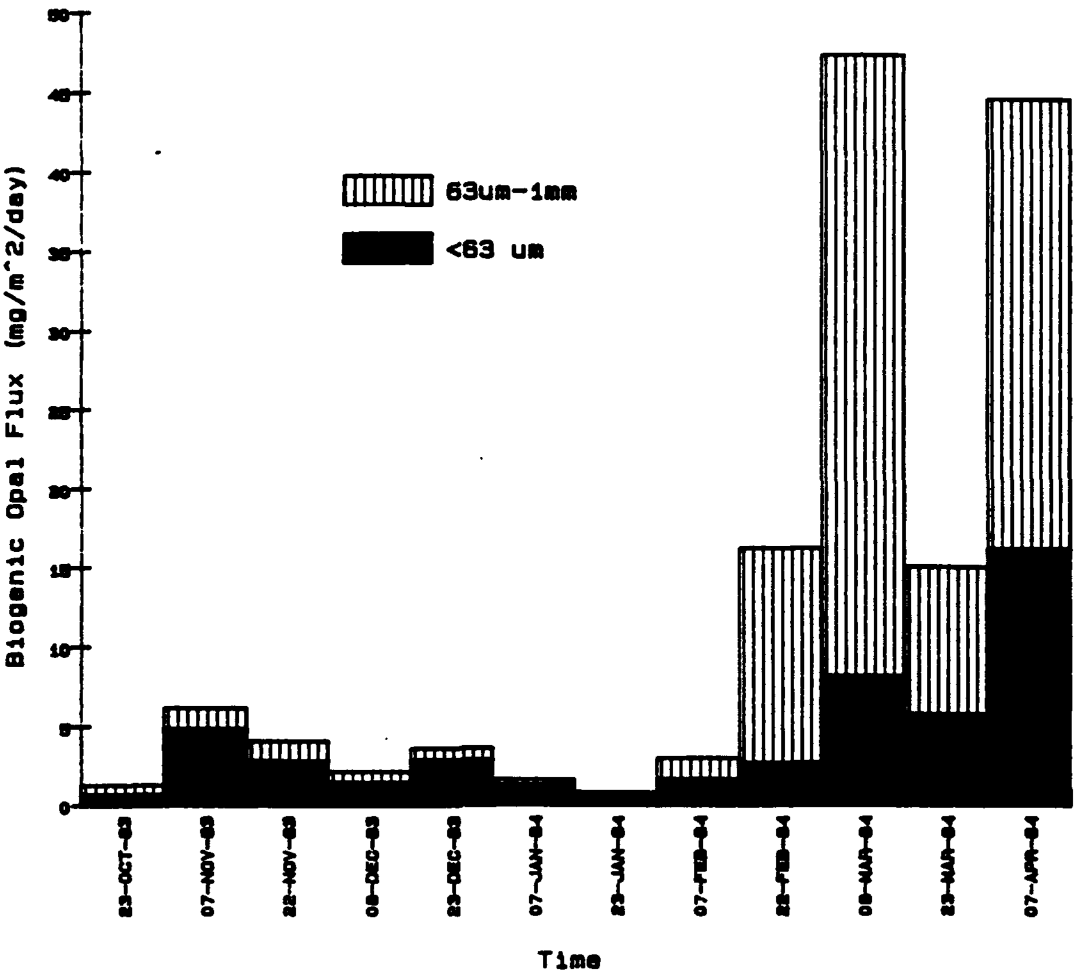
Combustible Flux at Black Sea 3. 1200 m. 1983-84



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
Combustible Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	22.52	8.57	17.40	6.62	0.00	0.00	39.92	15.19
2	13.12	21.73	6.59	10.92	0.00	0.00	19.71	32.65
3	14.18	25.32	7.47	13.33	0.00	0.00	21.64	38.65
4	13.58	16.79	4.91	6.07	0.00	0.00	18.48	22.86
5	14.23	10.22	2.76	1.98	0.00	0.00	16.99	12.20
6	9.29	5.66	3.09	1.88	0.00	0.00	12.38	7.54
7	8.20	1.59	3.35	.65	0.00	0.00	11.56	2.25
8	7.63	1.67	8.14	1.78	0.00	0.00	15.77	3.44
9	2.69	1.41	16.59	8.68	0.00	0.00	19.28	10.09
10	2.28	7.35	11.76	37.81	0.00	0.00	14.05	45.16
11	6.44	5.72	6.29	5.59	0.00	0.00	12.72	11.32
12	5.28	17.74	5.26	17.68	0.00	0.00	10.53	35.43

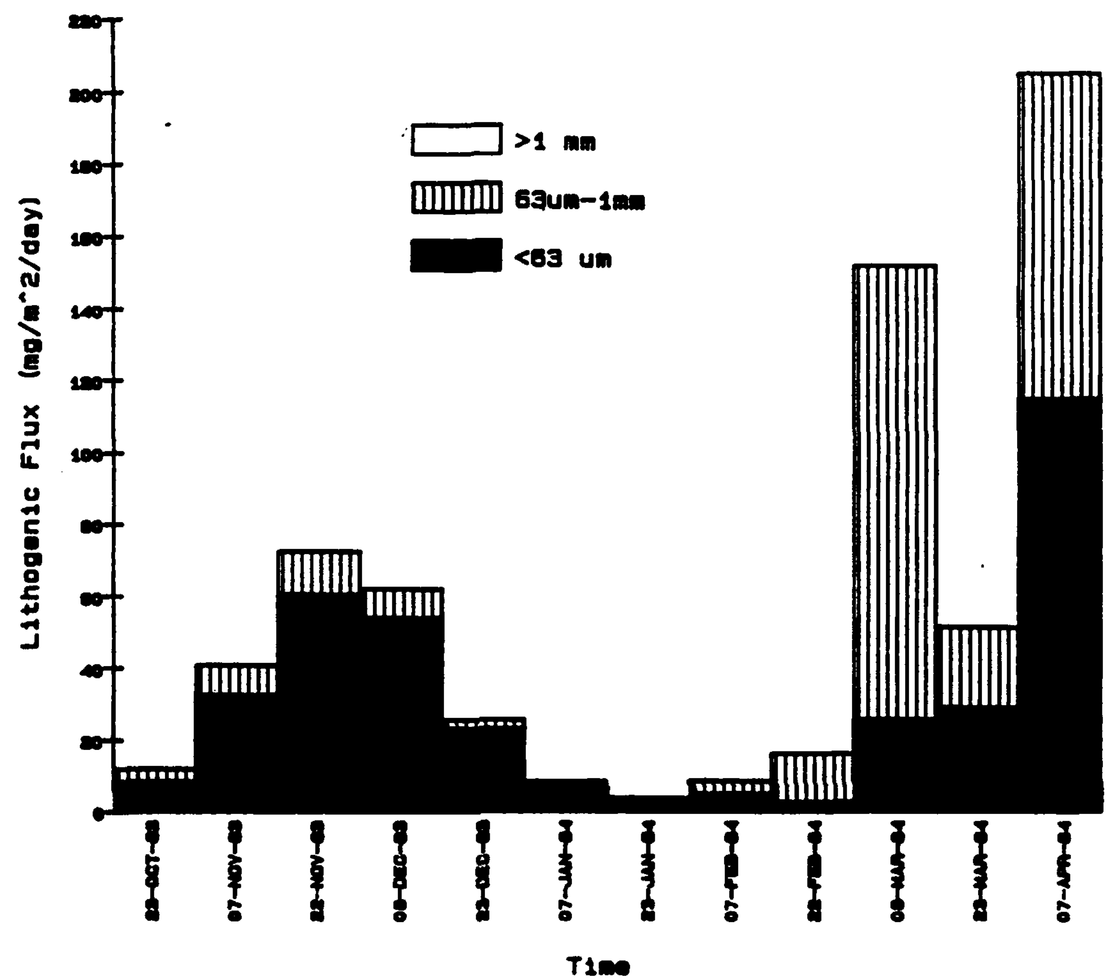
Biogenic Silica Flux at Black Sea 3, 1200 m, 1983-84



Sample ID#	OPAL <63	OPAL % Ncmb.<63	OPAL 63-1	OPAL % Ncmb.63-1	OPAL total	OPALtot. %Ncmb.
BS3-1200-1*	0.69	5.09	0.63	4.65	1.31	9.67
BS3-1200-2*	4.85	10.92	1.31	2.95	6.17	13.89
BS3-1200-3*	2.85	3.77	1.28	1.69	4.13	5.46
BS3-1200-4*	1.46	2.27	0.71	1.10	2.17	3.38
BS3-1200-5*	2.88	9.85	0.77	2.63	3.66	12.52
BS3-1200-6*	1.30	12.67	0.34	3.31	1.64	15.98
BS3-1200-7*	0.52	10.99	0.33	6.97	0.85	17.96
BS3-1200-8*	1.63	13.88	1.37	11.67	3.00	25.55
BS3-1200-9*	2.67	8.21	13.54	41.63	16.21	49.84
BS3-1200-10*	8.15	3.89	39.15	18.71	47.30	22.60
BS3-1200-11*	5.78	8.69	9.30	13.98	15.08	22.67
BS3-1200-12*	16.18	6.47	28.36	11.35	44.54	17.82

Flux is in mg/m^2/day.

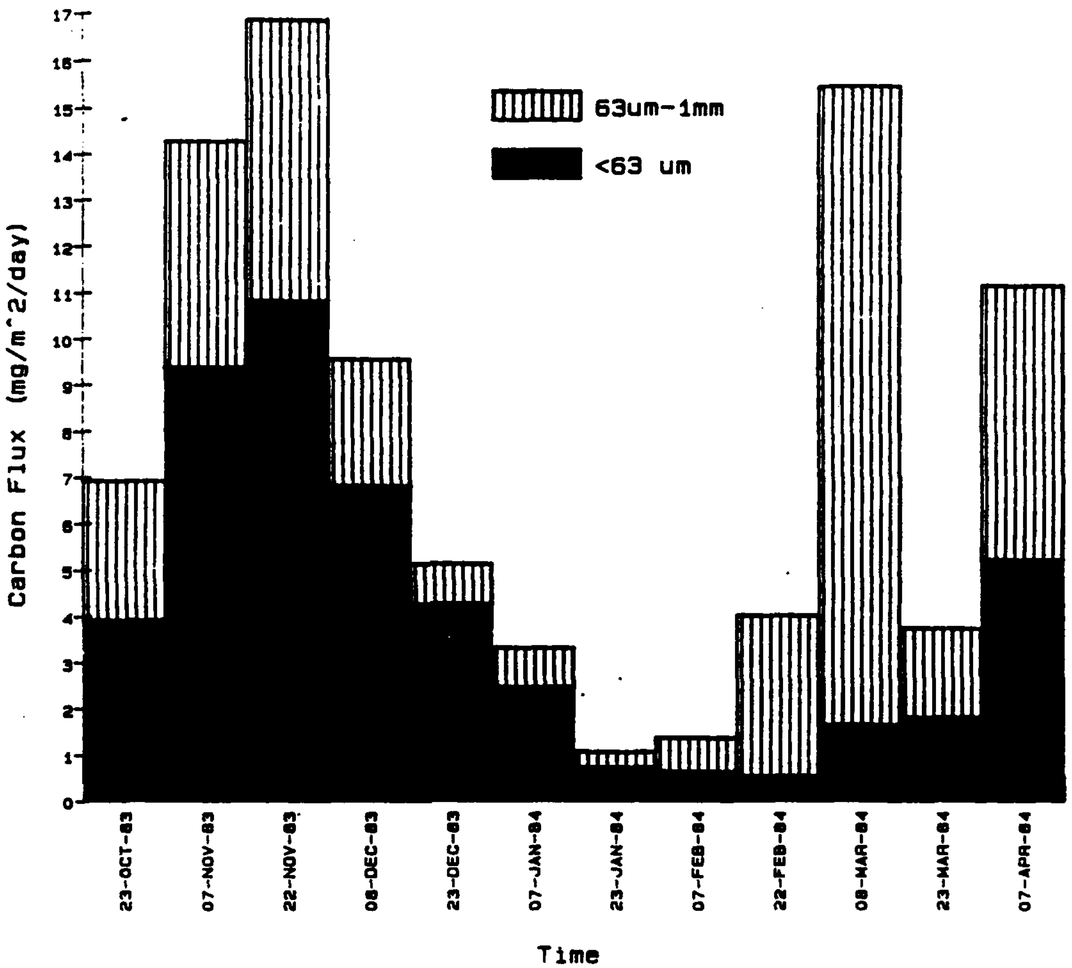
Lithogenic Flux at Black Sea 3, 1200 m, 1983-84



Sample I.D.	LITH <63	LITH<63 %ncmb.	LITH 63-1	LITH63-1 %ncmb.	LITH >1	LITH>1 %ncmb.	LITH total	LITH %total
BS3-1200-1*	8.40	61.99	3.83	28.27	0.00	0.00	12.23	90.26
BS3-1200-2*	32.68	73.59	8.30	18.69	0.00	0.00	40.98	92.28
BS3-1200-3*	60.42	79.83	12.09	15.97	0.00	0.00	72.51	95.80
BS3-1200-4*	53.94	57.22	8.14	12.67	0.00	0.00	62.08	96.61
BS3-1200-5*	23.17	79.27	2.39	8.18	0.00	0.00	25.56	87.44
BS3-1200-6*	6.91	67.35	1.70	16.57	0.00	0.00	8.61	83.92
BS3-1200-7*	3.06	64.69	0.82	17.34	0.00	0.00	3.88	82.03
BS3-1200-8*	4.90	41.74	3.83	32.62	0.00	0.00	8.73	74.36
BS3-1200-9*	2.60	7.99	13.71	42.15	0.00	0.00	16.31	50.14
BS3-1200-10*	25.66	12.26	126.32	60.36	0.00	0.00	151.98	72.62
BS3-1200-11*	29.10	43.75	22.34	33.58	0.00	0.00	51.44	77.33
BS3-1200-12*	114.79	45.93	90.61	36.25	0.00	0.00	205.40	82.18

Flux is in mg/m^2/day.

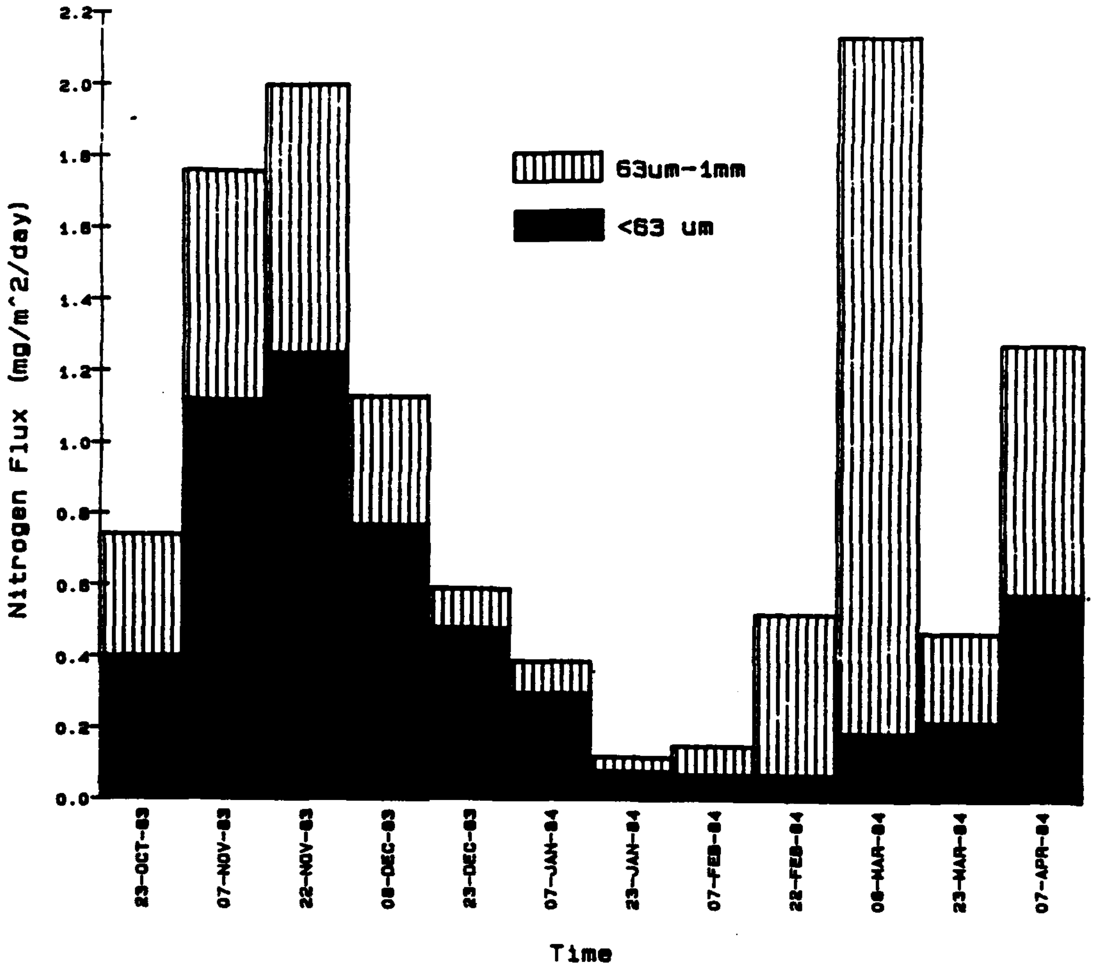
Carbon Flux at Black Sea 3, 1200 m, 1983-84



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
CARBON FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	25.84	3.92	19.84	3.01	0.00	0.00	45.68	6.94
2	28.77	9.39	14.99	4.90	0.00	0.00	43.77	14.29
3	28.02	10.83	15.64	6.05	0.00	0.00	43.66	16.88
4	29.81	6.82	12.00	2.74	0.00	0.00	41.81	9.56
5	34.98	4.27	7.08	.86	0.00	0.00	42.06	5.13
6	32.90	2.48	11.23	.85	0.00	0.00	44.12	3.33
7	33.04	.74	15.29	.34	0.00	0.00	48.32	1.09
8	18.57	.64	21.42	.74	0.00	0.00	39.99	1.38
9	5.38	.54	34.55	3.49	0.00	0.00	39.93	4.03
10	3.65	1.65	30.57	13.80	0.00	0.00	34.21	15.45
11	16.00	1.81	17.21	1.95	0.00	0.00	33.21	3.76
12	14.78	5.23	16.78	5.94	0.00	0.00	31.56	11.18

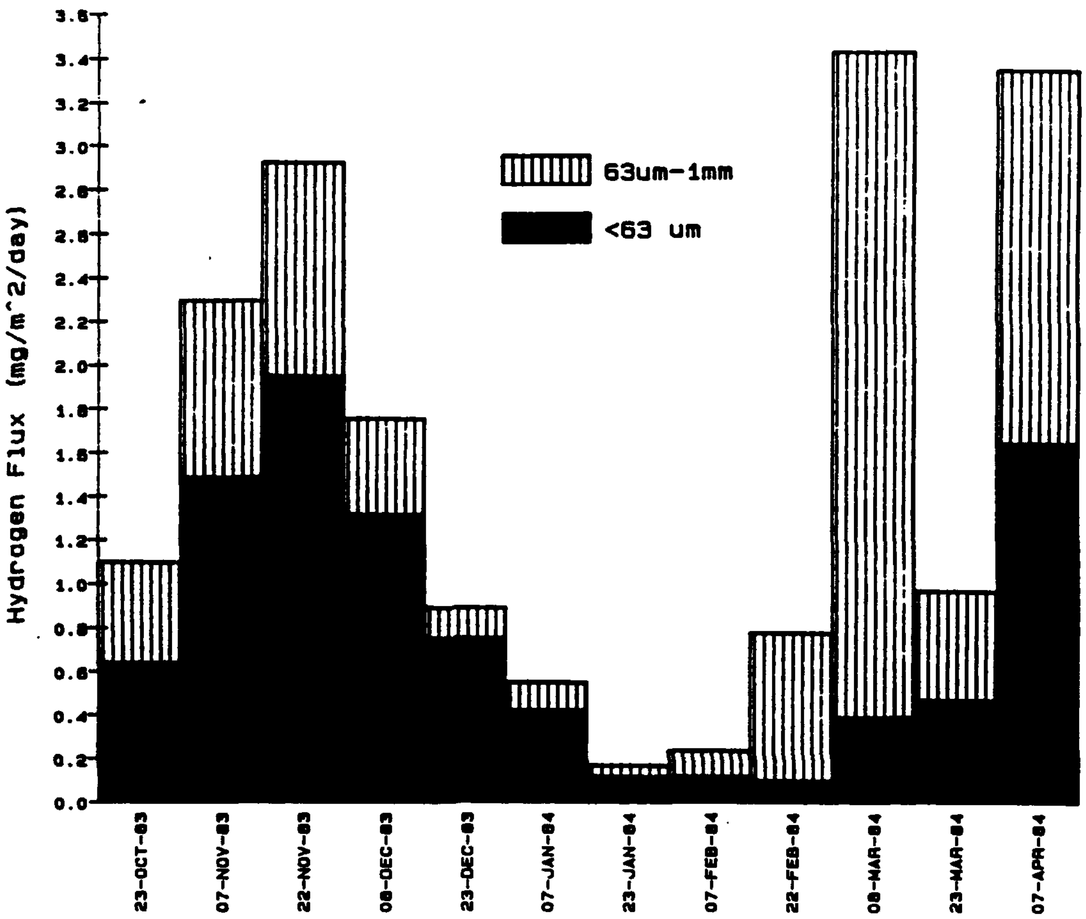
Nitrogen Flux at Black Sea 3, 1200 m, 1983-84



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
NITROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	2.64	.40	2.23	.34	0.00	0.00	4.87	.74
2	3.45	1.12	1.96	.64	0.00	0.00	5.40	1.76
3	3.24	1.25	1.95	.75	0.00	0.00	5.19	2.01
4	3.38	.77	1.56	.36	0.00	0.00	4.94	1.13
5	3.93	.48	.94	.11	0.00	0.00	4.87	.59
6	3.94	.30	1.18	.09	0.00	0.00	5.12	.39
7	3.57	.08	1.68	.04	0.00	0.00	5.25	.12
8	2.07	.07	2.41	.08	0.00	0.00	4.49	.15
9	.65	.07	4.45	.45	0.00	0.00	5.10	.51
10	.42	.19	4.32	1.95	0.00	0.00	4.74	2.14
11	1.94	.22	2.24	.25	0.00	0.00	4.17	.47
12	1.64	.58	1.97	.70	0.00	0.00	3.60	1.28

Hydrogen Flux at Black Sea 3. 1200 m. 1983-84



BLACK SEA 3 1200M. EACH CUP WAS OPEN FOR 15.33 DAYS.
Mark 5 trap open from OCT 15 1983 to APRIL 15 1984 at 1200 meters.
HYDROGEN FLUX (mg / m^2 / day)
Cmb is Total Combustible Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX	% of Cmb	FLUX
1	4.23	.64	3.01	.46	0.00	0.00	7.24	1.10
2	4.57	1.49	2.47	.81	0.00	0.00	7.04	2.30
3	5.06	1.95	2.52	.98	0.00	0.00	7.58	2.93
4	5.78	1.32	1.94	.44	0.00	0.00	7.72	1.76
5	6.19	.75	1.13	.14	0.00	0.00	7.31	.89
6	5.56	.42	1.67	.13	0.00	0.00	7.23	.54
7	5.45	.12	2.18	.05	0.00	0.00	7.64	.17
8	3.38	.12	3.55	.12	0.00	0.00	6.93	.24
9	1.03	.10	6.70	.68	0.00	0.00	7.72	.78
10	.86	.39	6.75	3.05	0.00	0.00	7.61	3.44
11	4.16	.47	4.44	.50	0.00	0.00	8.60	.97
12	4.66	1.65	4.82	1.71	0.00	0.00	9.48	3.36

Experiment BS-4

Flux at 245 m and 1,133 m deep

April 19, 1984

to

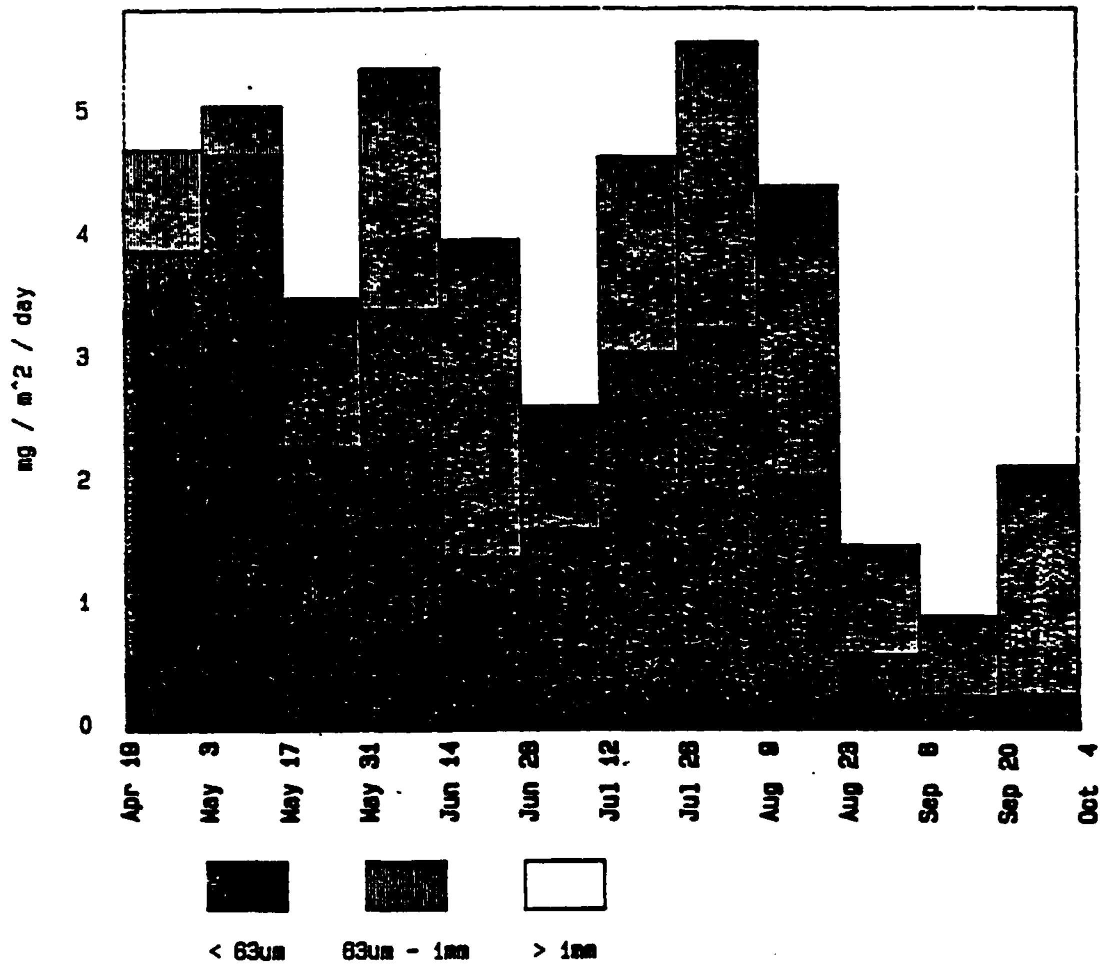
October 4, 1984

at

14 day intervals

<u>Warning</u>: Collection of the 245 m samples may have involved a mooring abnormality. Refer to the text, page 4.

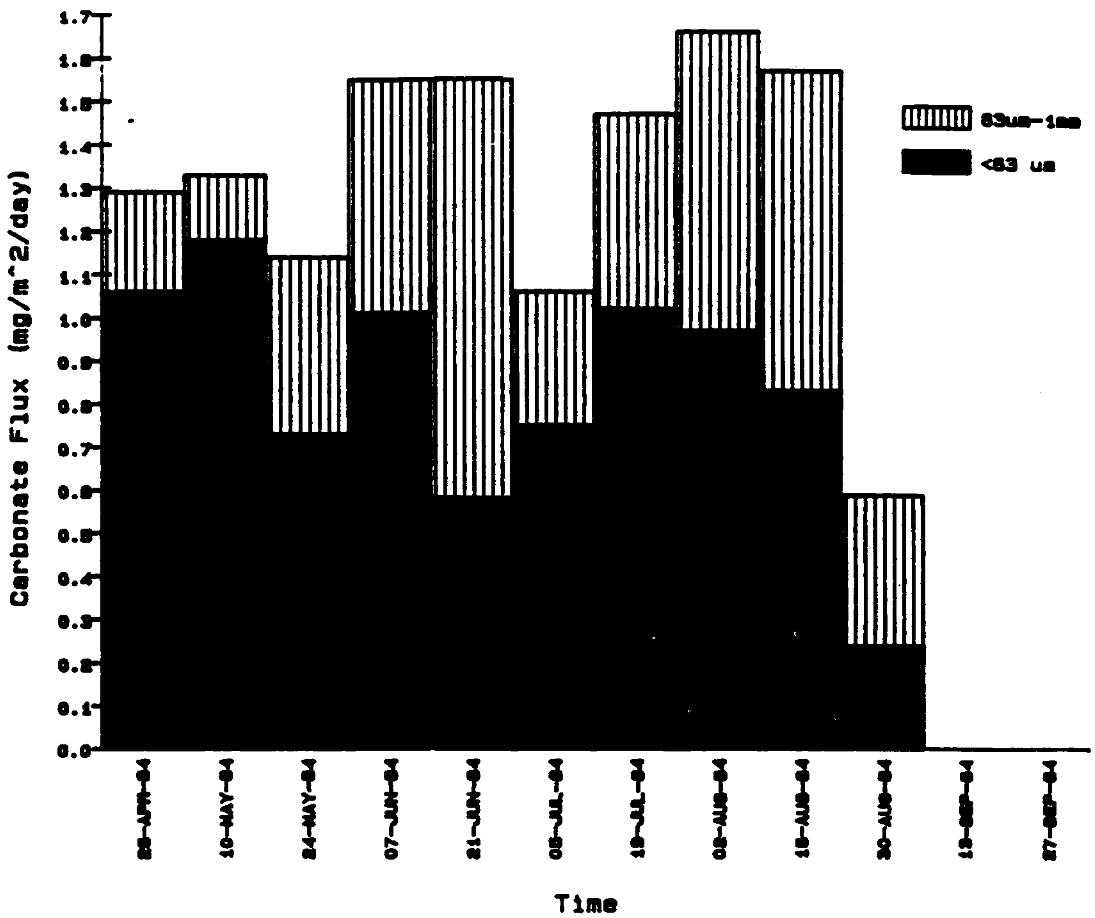
BLACK SEA 4 TOTAL FLUX AT 250m



Black Sea 4 250M 14 Day Opening
Mark 5 trap open from April 19 1984 to October 4 1984 at 250 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	82.67	3.96	17.33	.83	0.00	0.00	100.00	4.79
2	92.23	4.75	7.77	.40	0.00	0.00	100.00	5.15
3	65.73	2.34	34.27	1.22	0.00	0.00	100.00	3.56
4	63.67	3.47	36.33	1.98	0.00	0.00	100.00	5.45
5	35.15	1.42	64.85	2.62	0.00	0.00	100.00	4.04
6	61.80	1.65	38.20	1.02	0.00	0.00	100.00	2.67
7	65.89	3.11	34.11	1.61	0.00	0.00	100.00	4.72
8	58.48	3.31	41.52	2.35	0.00	0.00	100.00	5.66
9	46.65	2.09	53.35	2.39	0.00	0.00	100.00	4.48
10	40.40	.61	59.60	.90	0.00	0.00	100.00	1.51
11	28.26	.26	71.74	.66	0.00	0.00	100.00	.92
12	12.90	.28	87.10	1.89	0.00	0.00	100.00	2.17

Carbonate Flux at Black Sea 4, 250 m, 1984

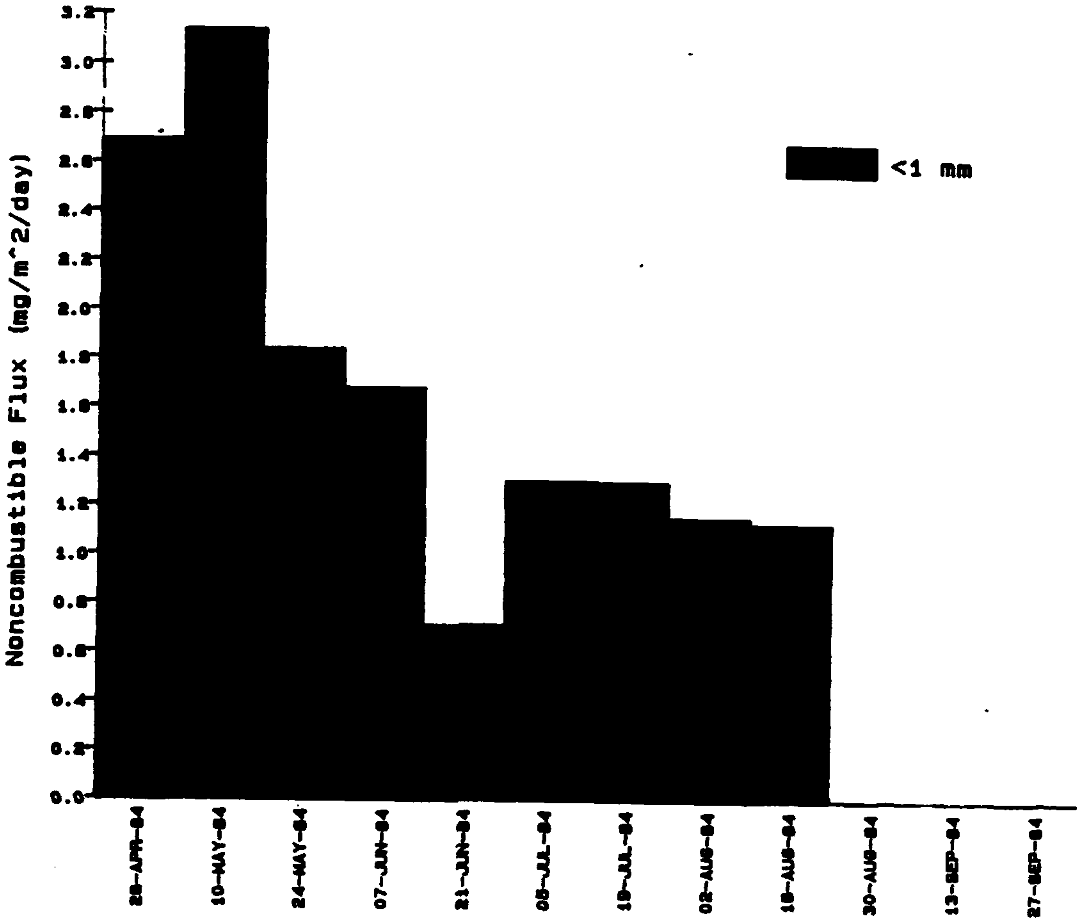


(No >1 mm flux).

Sample I.D.	CRTA <63	CRTA % tot.<63	CRTA 63-1	CRTA % tot.63-1	CRTA total	CRTA % total
BS4-250-1	1.1	22.13	0.23	4.80	1.29	26.93
BS4-250-2	1.2	22.91	0.15	2.91	1.33	25.83
BS4-250-3	0.7	20.51	0.41	11.52	1.14	32.02
BS4-250-4	1.0	18.53	0.54	9.91	1.55	28.44
BS4-250-5	0.6	14.36	0.97	24.01	1.55	38.37
BS4-250-6	0.8	28.09	0.31	11.61	1.05	39.33
BS4-250-7	1.0	21.61	0.45	9.53	1.47	31.14
BS4-250-8	1.0	17.14	0.69	12.19	1.66	29.33
BS4-250-9	0.8	18.53	0.74	16.52	1.58	35.27
BS4-250-10	0.2	15.89	0.35	23.18	0.58	38.41
BS4-250-11						
BS4-250-12						

Flux is expressed in mg/m^2/day.

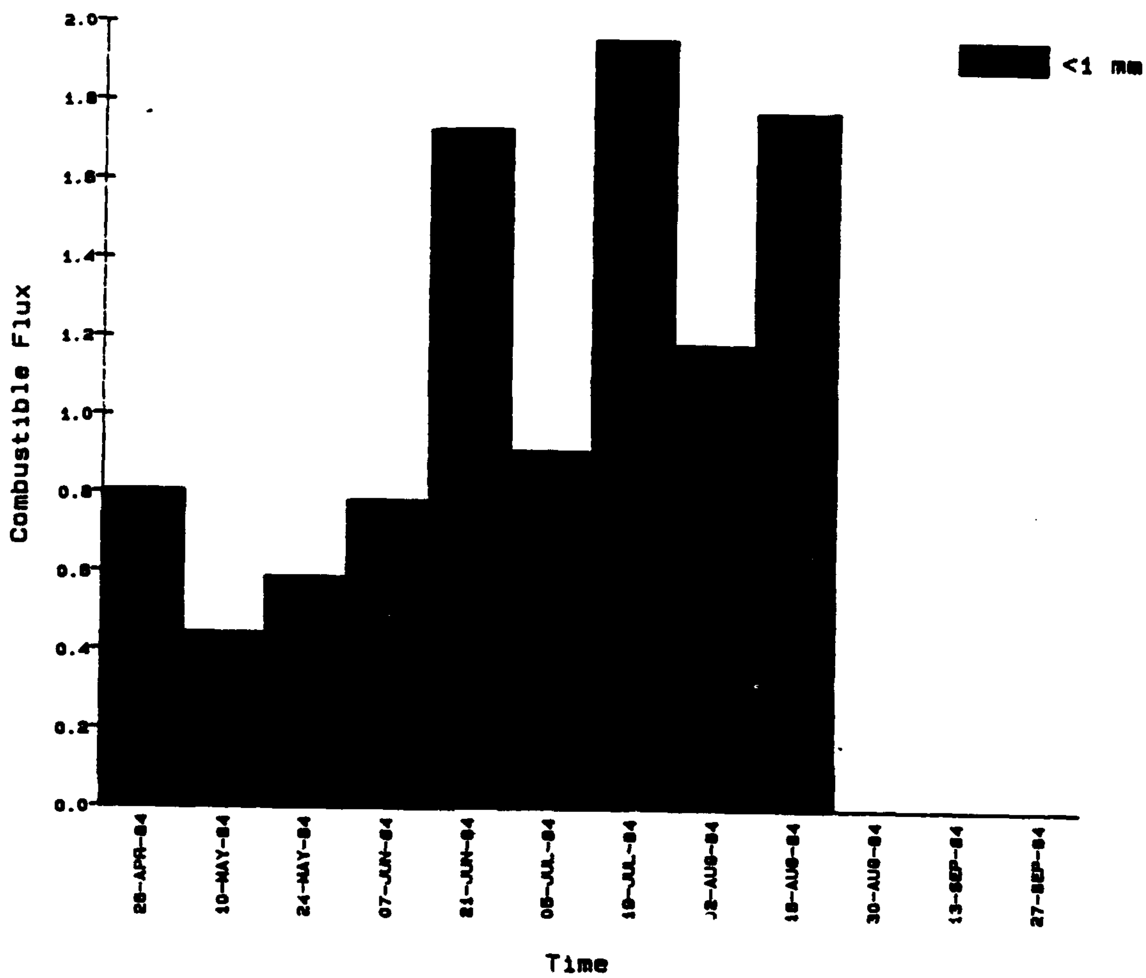
Noncombustible Flux at Black Sea 4, 250 m, 1984



Sample ID#	NONC <1	NONC % tot.<1
BS4-250-1*	2.69	56.22
BS4-250-2*	3.13	60.78
BS4-250-3*	1.84	51.59
BS4-250-4*	1.68	30.83
BS4-250-5*	0.71	17.57
BS4-250-6*	1.30	48.69
BS4-250-7*	1.30	27.47
BS4-250-8*	1.15	20.32
BS4-250-9*	1.13	25.16
BS4-250-10*		
BS4-250-11*		
BS4-250-12*		

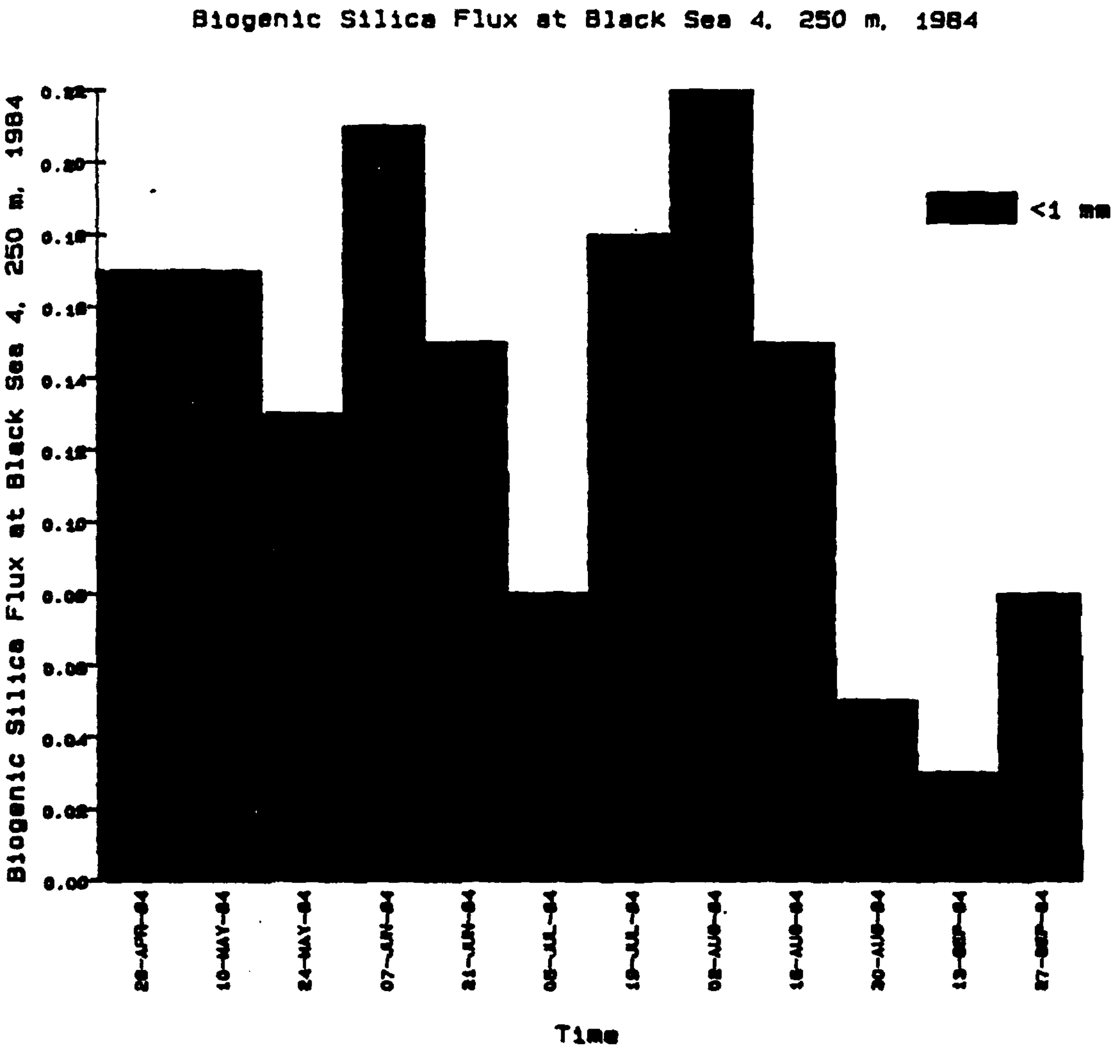
Flux is in mg/m^2/day.
Only <1mm combustible analyzed due to low total flux.

Combustible Flux at Black Sea 4, 250 m, 1984



Sample ID#	COMB TOTAL	COMB % total
BS4-250-1*	0.81	16.84
BS4-250-2*	0.44	8.63
BS4-250-3*	0.59	16.49
BS4-250-4*	0.78	14.37
BS4-250-5*	1.73	42.82
BS4-250-6*	0.91	34.08
BS4-250-7*	1.96	41.46
BS4-250-8*	1.18	20.93
BS4-250-9*	1.78	39.64
BS4-250-10*		
BS4-250-11*		
BS4-250-12*		

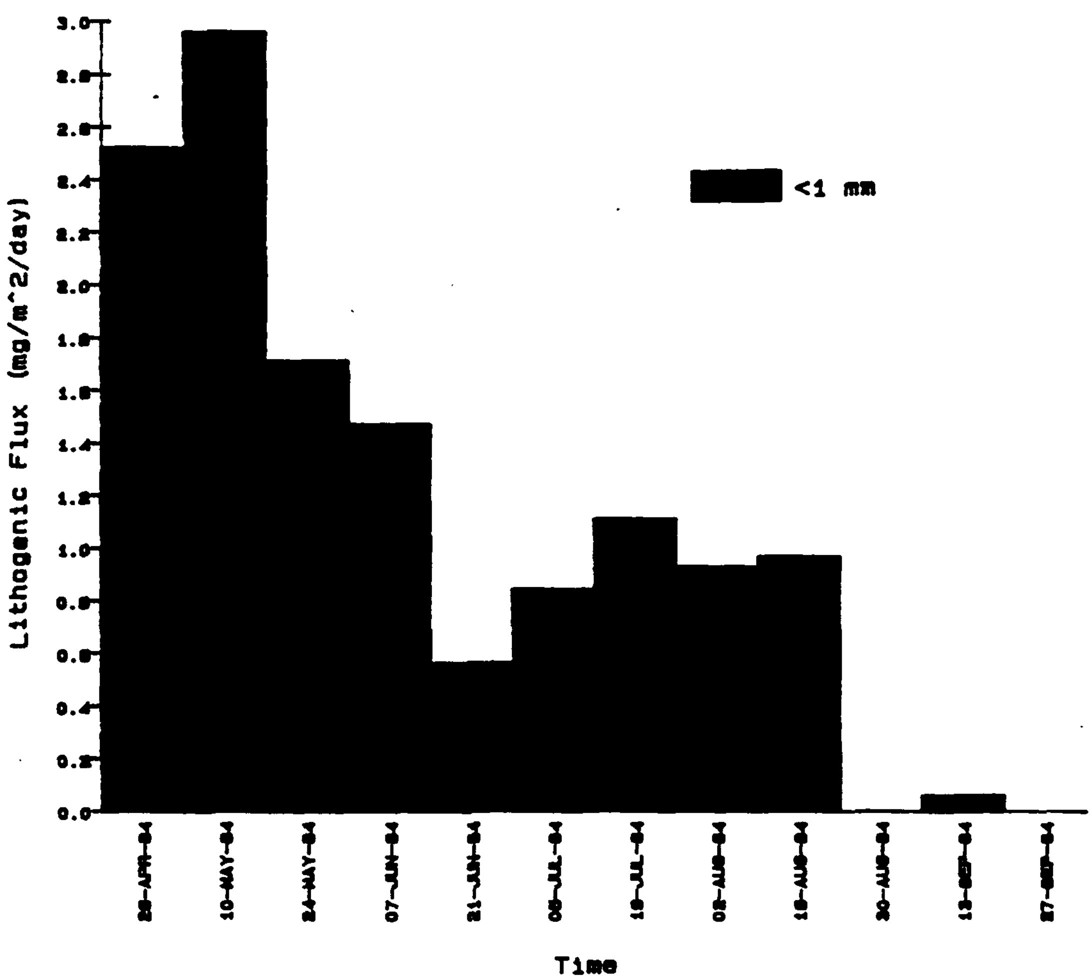
Flux is in mg/m^2/day.
Only <1mm combustible analyzed due to low total flux.



Sample ID#	OPAL <1	OPAL<1 %Ncmb.
BS4-250-1*	0.17	6.32
BS4-250-2*	0.17	5.43
BS4-250-3*	0.13	7.07
BS4-250-4*	0.21	12.50
BS4-250-5*	0.15	21.13
BS4-250-6*	0.08	8.00
BS4-250-7*	0.18	13.95
BS4-250-8*	0.22	19.13
BS4-250-9*	0.15	13.39
BS4-250-10*	0.05	8.20
BS4-250-11*	0.03	33.33
BS4-250-12*	0.08	

Flux is in mg/m^2/day.
Only <1mm combustible analyzed due to low total flux.

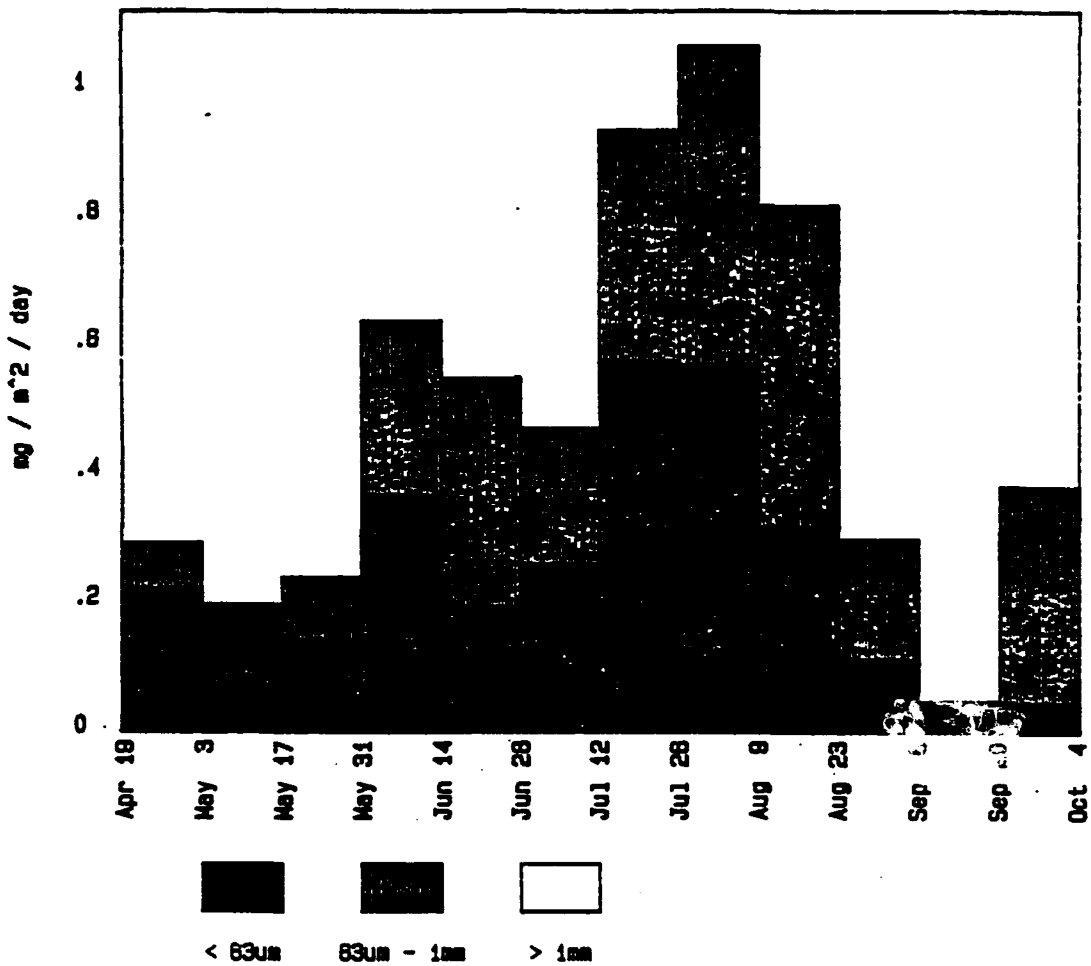
Lithogenic Flux at Black Sea 4, 250 m, 1984



Sample ID#	LITH <1	LITH<1 %Ncmb.
BS4-250-1*	2.52	93.68
BS4-250-2*	2.96	94.57
BS4-250-3*	1.71	92.93
BS4-250-4*	1.47	87.50
BS -250-5*	0.56	78.87
BS4-250-6*	0.84	84.00
BS4-250-7*	1.11	86.05
BS4-250-8*	0.93	80.87
BS4-250-9*	0.97	86.61
BS4-250-10*		
BS4-250-11*	0.06	66.67
BS4-250-12*		

Flux is in mg/m^2/day.
Only <1mm combustible analyzed due to low total flux.

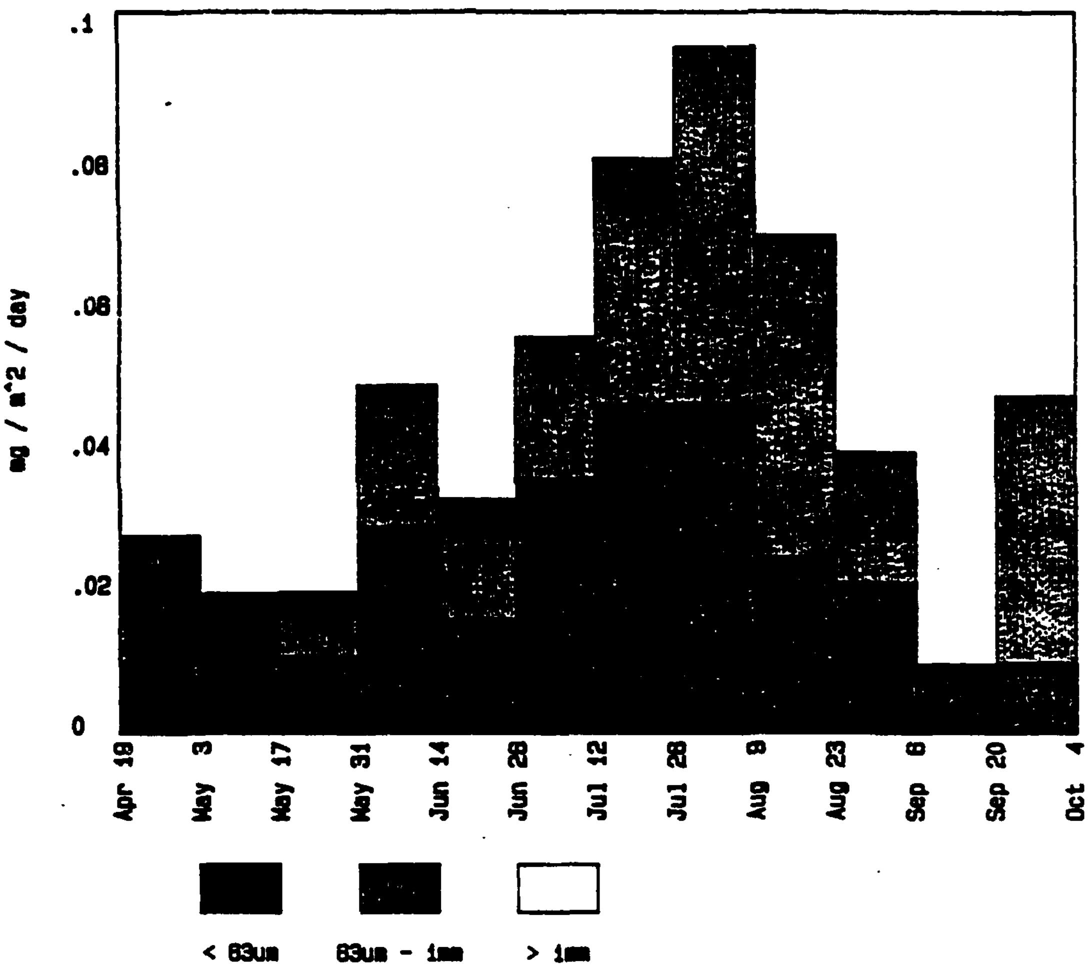
BLACK SEA 4 CARBON FLUX AT 250m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 250 meters.
CARBON FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	4.71	.23	1.49	.07	0.00	0.00	6.21	.30
2	3.89	.20			0.00	0.00	3.89	.20
3	4.05	.14	2.78	.10	0.00	0.00	6.82	.24
4	6.85	.37	5.03	.27	0.00	0.00	11.87	.65
5	4.86	.20	8.93	.36	0.00	0.00	13.79	.56
6	9.85	.26	8.03	.21	0.00	0.00	17.89	.48
7	12.34	.58	7.74	.37	0.00	0.00	20.09	.95
8	10.22	.58	8.86	.50	0.00	0.00	19.08	1.08
9	7.18	.32	11.35	.51	0.00	0.00	18.53	.83
10	7.63	.12	12.41	.19	0.00	0.00	20.03	.30
11	5.43	.05			0.00	0.00	5.43	.05
12	2.17	.05	15.63	.34	0.00	0.00	17.81	.39

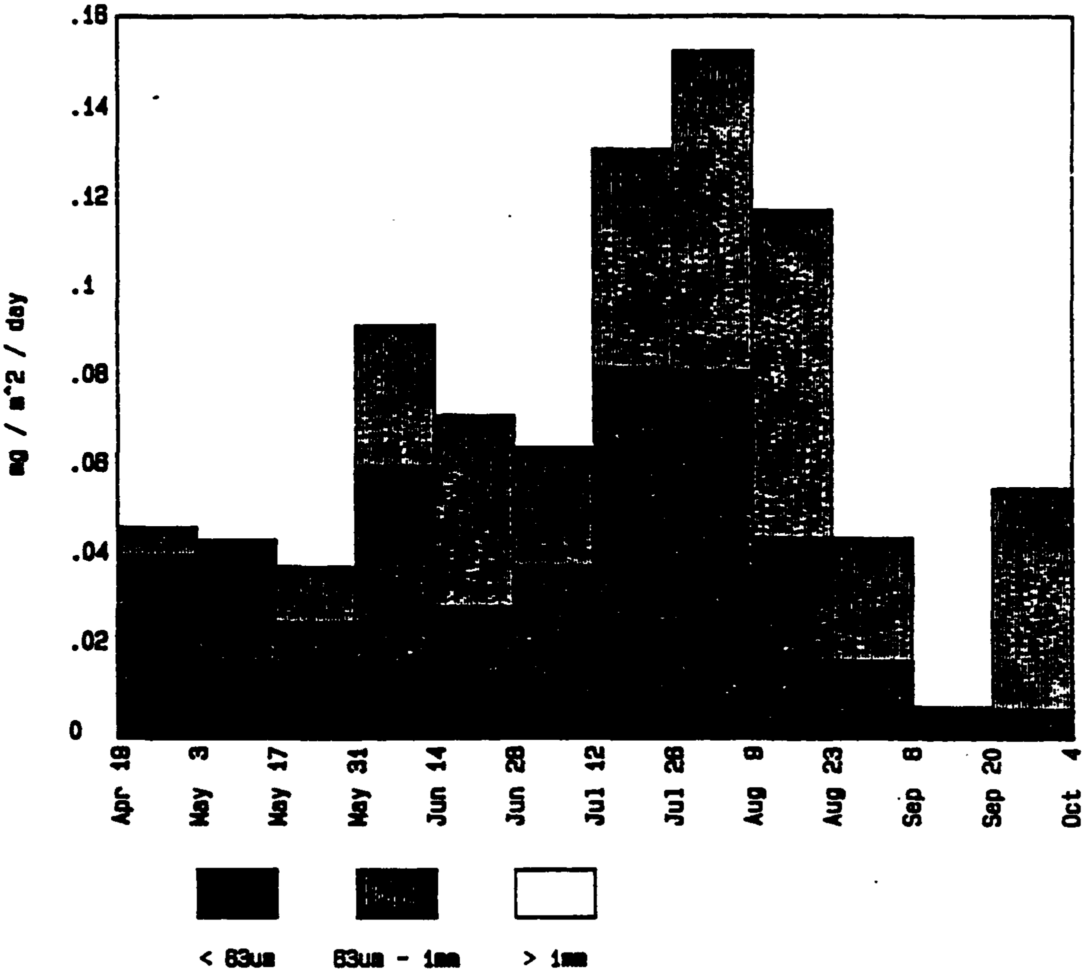
BLACK SEA 4 NITROGEN FLUX AT 250m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 250 meters.
NITROGEN FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	.50	.02	.09	.00	0.00	0.00	.59	.03
2	.39	.02			0.00	0.00	.39	.02
3	.31	.01	.26	.01	0.00	0.00	.57	.02
4	.55	.03	.38	.02	0.00	0.00	.92	.05
5	.41	.02	.43	.02	0.00	0.00	.83	.03
6	1.38	.04	.77	.02	0.00	0.00	2.14	.06
7	1.01	.05	.75	.04	0.00	0.00	1.76	.08
8	.84	.05	.91	.05	0.00	0.00	1.75	.10
9	.56	.03	1.04	.05	0.00	0.00	1.60	.07
10	1.43	.02	1.25	.02	0.00	0.00	2.68	.04
11	1.06	.01			0.00	0.00	1.06	.01
12	.46	.01	1.78	.04	0.00	0.00	2.24	.05

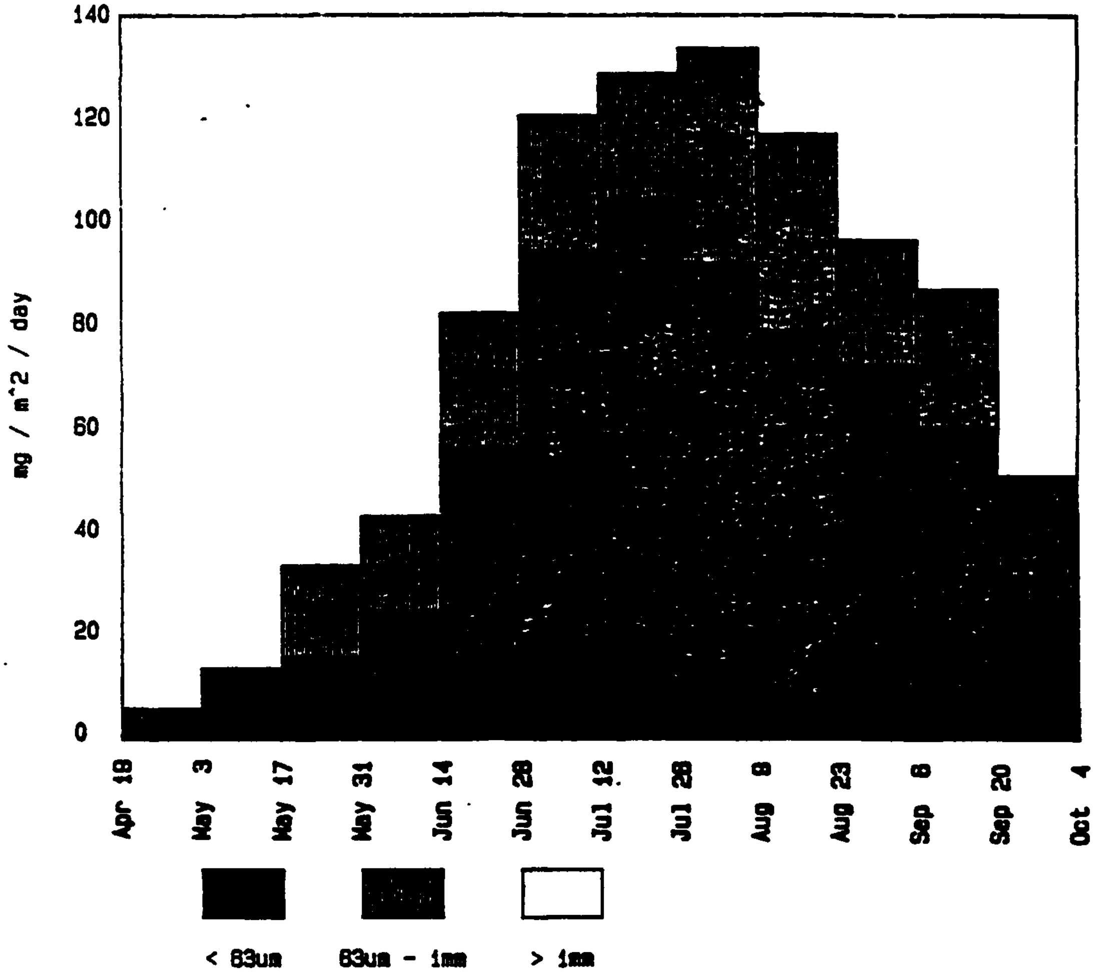
BLACK SEA 4 HYDROGEN FLUX AT 250m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 250 meters.
HYDROGEN FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	.86	.04	.13	.01	0.00	0.00	.99	.05
2	.87	.04			0.00	0.00	.87	.04
3	.73	.03	.35	.01	0.00	0.00	1.08	.04
4	1.13	.06	.59	.03	0.00	0.00	1.72	.09
5	.73	.03	1.08	.04	0.00	0.00	1.81	.07
6	1.45	.04	1.01	.03	0.00	0.00	2.46	.07
7	1.78	.08	1.05	.05	0.00	0.00	2.83	.13
8	1.47	.08	1.28	.07	0.00	0.00	2.75	.10
9	1.01	.05	1.67	.07	0.00	0.00	2.68	.12
10	1.15	.02	1.84	.03	0.00	0.00	2.99	.05
11	.77	.01			0.00	0.00	.77	.01
12	.30	.01	2.31	.05	0.00	0.00	2.61	.06

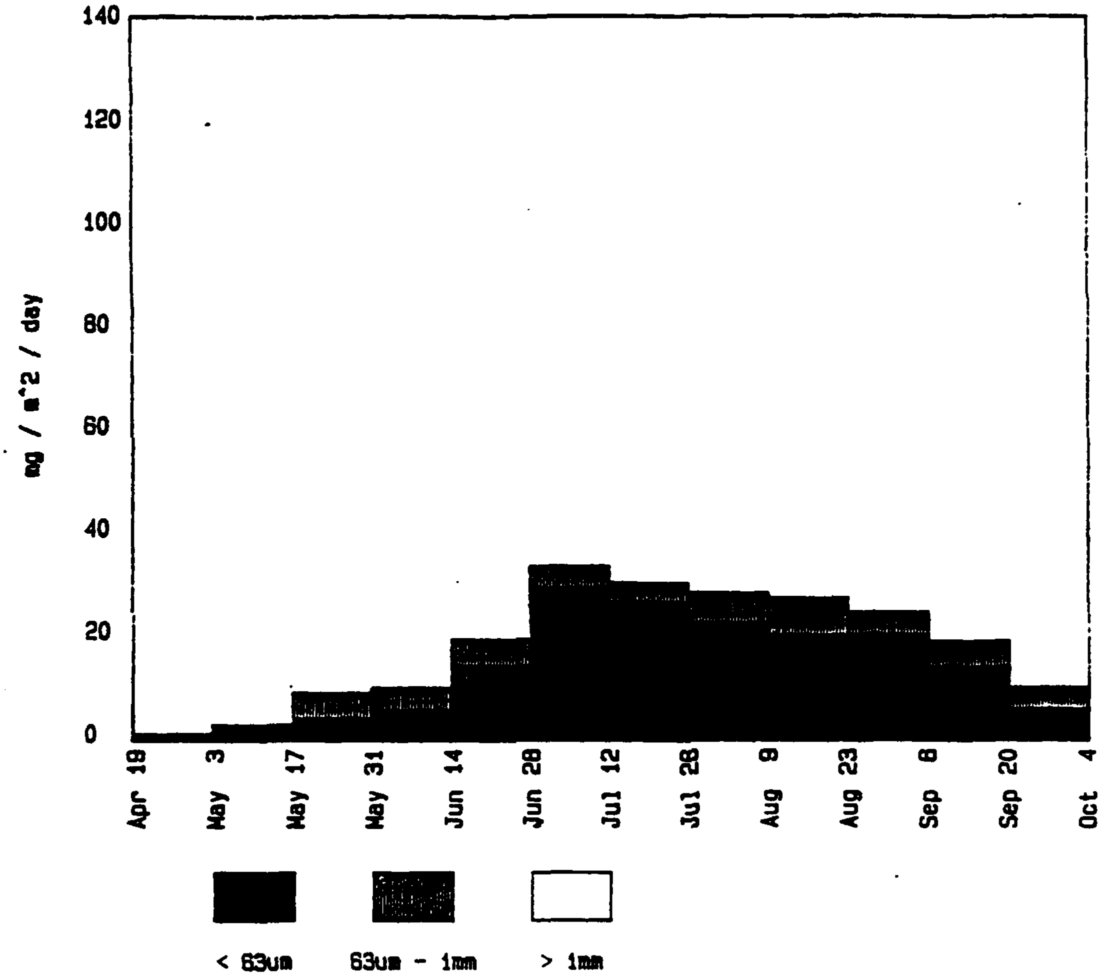
BLACK SEA 4 TOTAL FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
TOTAL FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	47.86	2.79	52.14	3.04	0.00	0.00	100.00	5.83
2	90.43	12.57	9.57	1.33	0.00	0.00	100.00	13.90
3	47.01	16.18	52.99	18.24	0.00	0.00	100.00	34.42
4	57.38	25.36	42.62	18.84	0.00	0.00	100.00	44.20
5	68.59	57.55	31.41	26.35	0.00	0.00	100.00	83.90
6	78.26	96.21	21.74	26.73	0.00	0.00	100.00	122.94
7	81.04	106.32	18.96	24.87	0.00	0.00	100.00	131.19
8	68.89	93.80	31.11	42.36	0.00	0.00	100.00	136.16
9	67.61	80.64	32.39	38.63	0.00	0.00	100.00	119.27
10	75.14	73.91	24.86	24.45	0.00	0.00	100.00	98.36
11	69.50	61.57	30.50	27.02	0.00	0.00	100.00	88.59
12	52.57	27.32	47.43	24.65	0.00	0.00	100.00	51.97

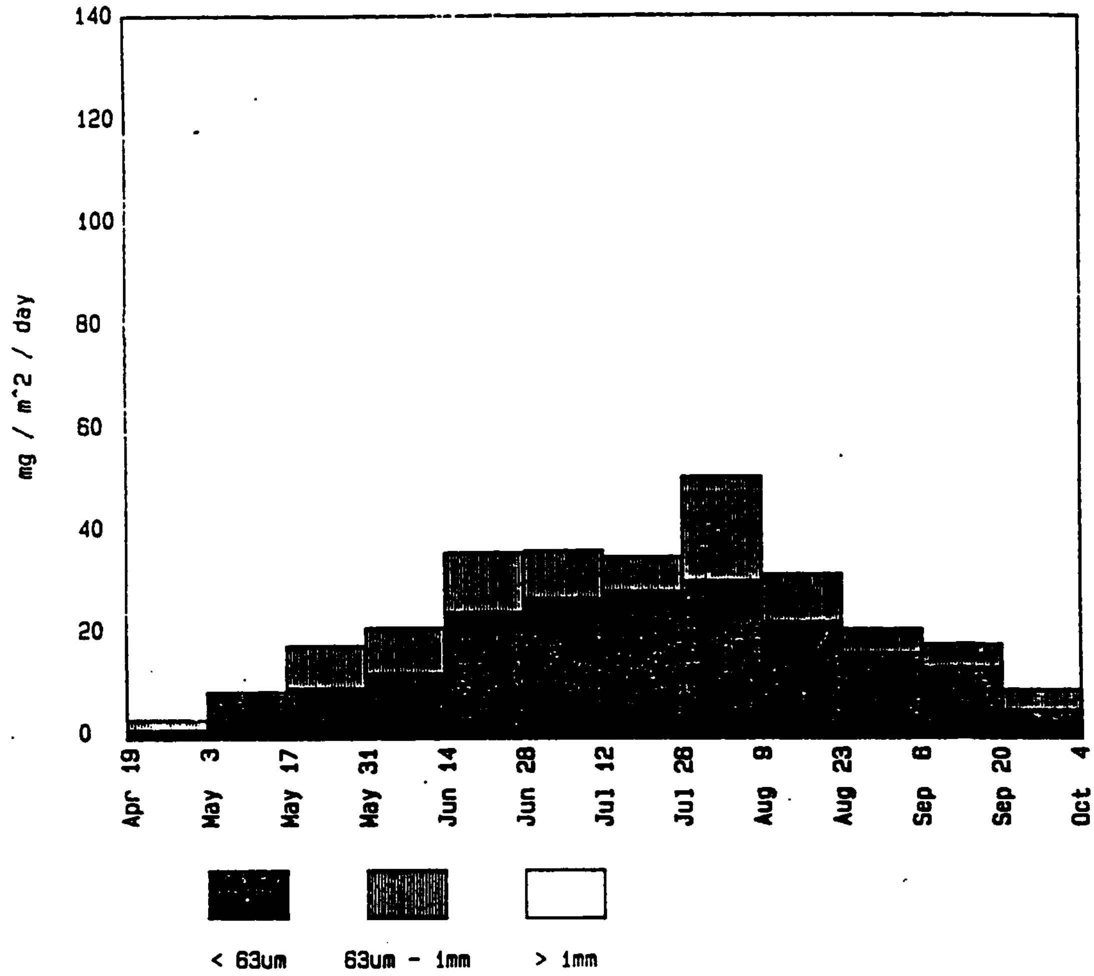
BLACK SEA 4 CARBONATE FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
Carbonate Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	10.05	.59	10.18	.59	0.00	0.00	20.23	1.18
2	18.64	2.59	2.95	.41	0.00	0.00	21.58	3.00
3	12.36	4.25	14.54	5.00	0.00	0.00	26.89	9.26
4	13.29	5.87	9.88	4.37	0.00	0.00	23.17	10.24
5	17.31	14.52	6.17	5.18	0.00	0.00	23.48	19.70
6	24.16	29.71	3.55	4.36	0.00	0.00	27.71	34.07
7	20.60	27.03	2.84	3.73	0.00	0.00	23.45	30.76
8	16.82	22.91	4.32	5.89	0.00	0.00	21.15	28.79
9	17.27	20.60	6.03	7.19	0.00	0.00	23.30	27.79
10	20.90	20.56	4.52	4.44	0.00	0.00	25.42	25.00
11	16.07	14.24	5.70	5.05	0.00	0.00	21.77	19.29
12	11.68	6.07	8.12	4.22	0.00	0.00	19.80	10.29

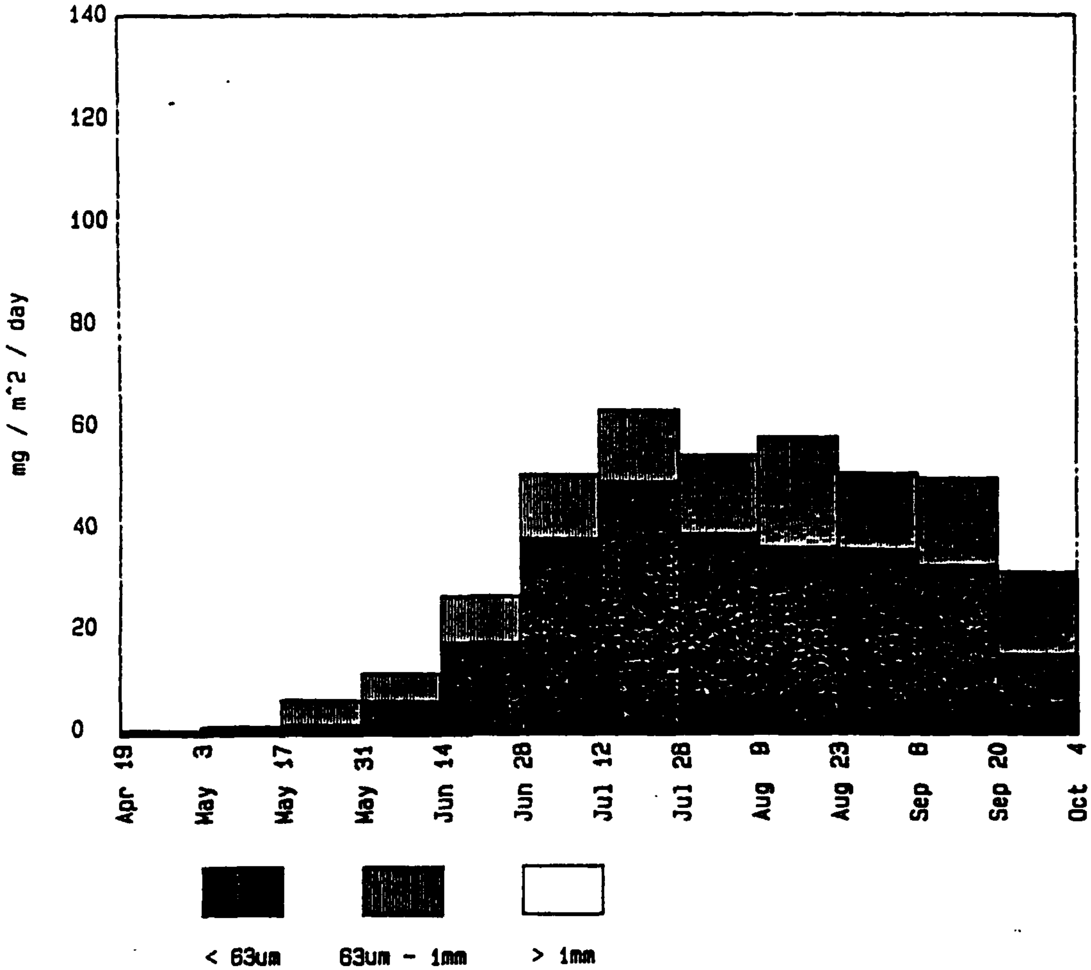
BLACK SEA 4 NON-COMBUSTIBLE FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
NON COMBUSTIBLE FLUX (mg / m^2 / day)
Ttl is total Flux in all size classes

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	29.73	1.73	34.27	2.00	0.00	0.00	63.99	3.73
2	60.92	8.47	5.60	.78	0.00	0.00	66.52	9.25
3	28.83	9.92	24.30	8.36	0.00	0.00	53.13	18.29
4	29.02	12.83	20.31	8.98	0.00	0.00	49.34	21.81
5	29.64	24.87	14.19	11.91	0.00	0.00	43.83	36.77
6	22.46	27.61	7.75	9.53	0.00	0.00	30.21	37.14
7	22.12	29.02	5.24	6.87	0.00	0.00	27.36	35.89
8	22.81	31.06	15.24	20.76	0.00	0.00	38.05	51.81
9	19.19	22.89	7.95	9.49	0.00	0.00	27.14	32.37
10	16.93	16.65	4.86	4.78	0.00	0.00	21.79	21.43
11	15.66	13.88	5.12	4.53	0.00	0.00	20.78	16.41
12	10.47	5.44	7.74	4.02	0.00	0.00	18.21	9.46

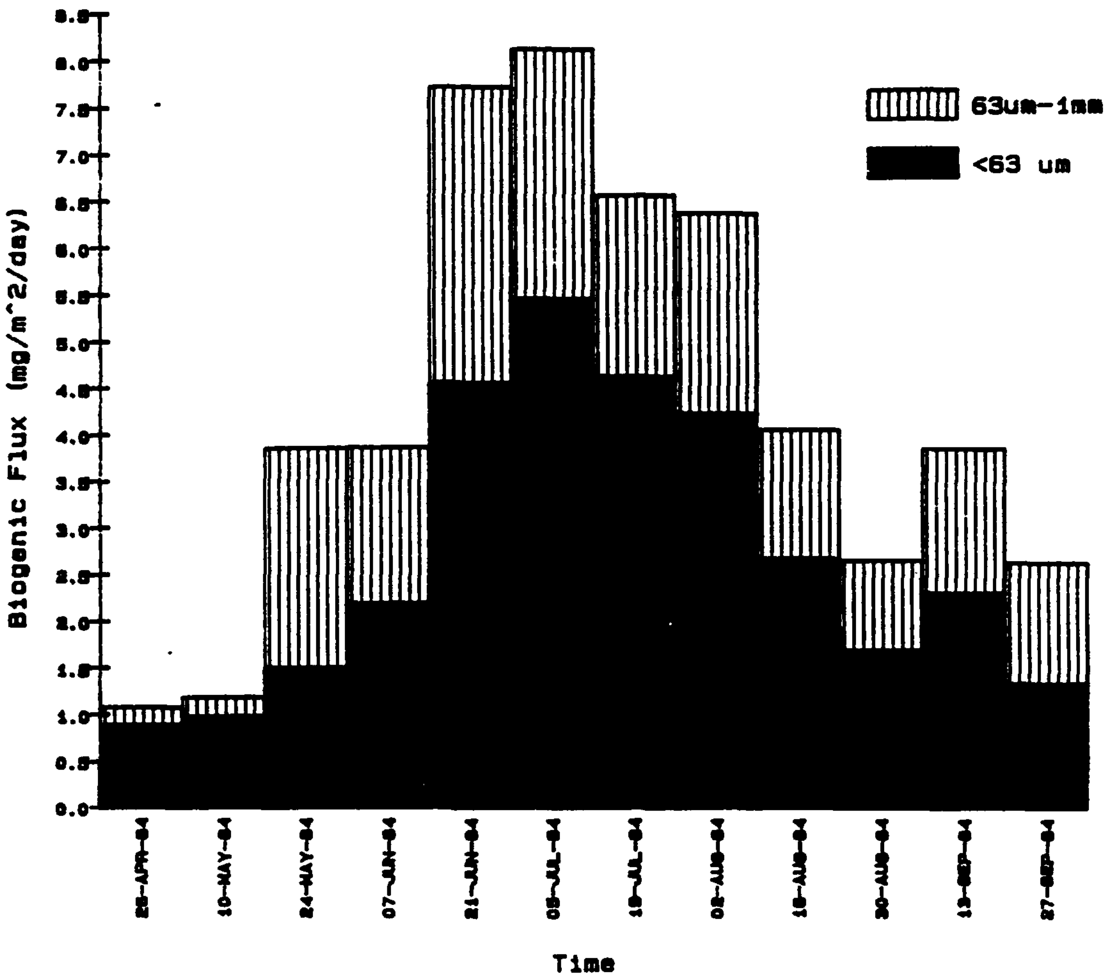
BLACK SEA 4 COMBUSTIBLE FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
Combustible Flux
Ttl is total Flux in all size classes

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	8.08	.47	7.69	.45	0.00	0.00	15.77	.92
2	10.87	1.51	1.02	.14	0.00	0.00	11.89	1.65
3	5.82	2.00	14.16	4.87	0.00	0.00	19.97	6.88
4	15.06	6.66	12.43	5.49	0.00	0.00	27.49	12.15
5	21.65	18.16	11.05	9.27	0.00	0.00	32.69	27.43
6	31.63	38.89	10.44	12.84	0.00	0.00	42.08	51.73
7	38.32	50.27	10.88	14.27	0.00	0.00	49.20	64.54
8	29.26	39.84	11.54	15.72	0.00	0.00	40.80	55.55
9	31.15	37.15	18.41	21.95	0.00	0.00	49.56	59.11
10	37.31	36.70	15.48	15.23	0.00	0.00	52.79	51.92
11	37.77	33.46	19.68	17.44	0.00	0.00	57.45	50.89
12	30.42	15.81	31.57	16.41	0.00	0.00	61.98	32.21

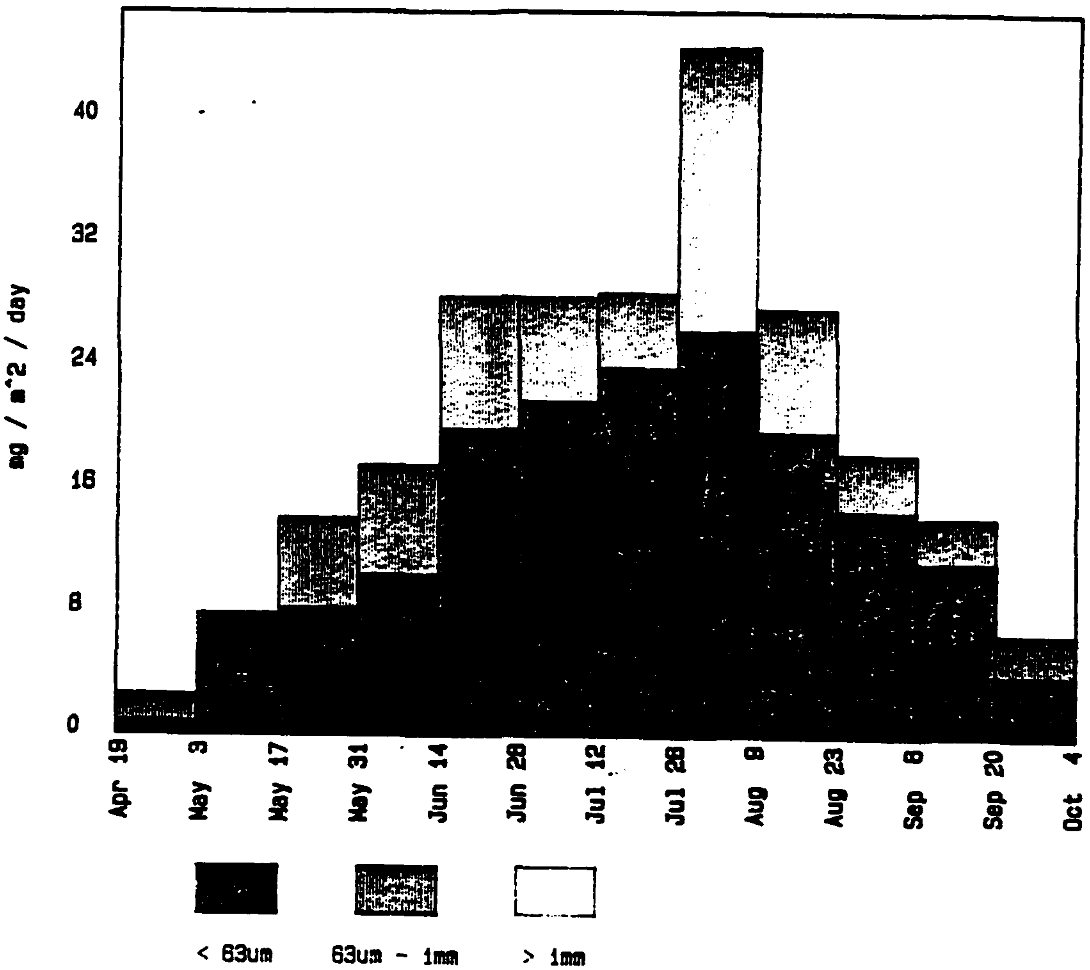
Biogenic Silica Flux at Black Sea 4, 1200 m, 1984



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
OPAL Flux
Ttl is Total Flux in all size classes.

C #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	15.25	.89	3.28	.19	0.00	0.00	18.53	1.08
2	7.03	.98	1.49	.21	0.00	0.00	8.53	1.19
3	4.37	1.50	6.85	2.36	0.00	0.00	11.23	3.86
4	4.96	2.19	3.80	1.68	0.00	0.00	8.77	3.87
5	5.43	4.56	3.78	3.17	0.00	0.00	9.21	7.73
6	4.44	5.46	2.17	2.67	0.00	0.00	6.61	8.13
7	3.52	4.62	1.49	1.95	0.00	0.00	5.01	6.57
8	3.11	4.23	1.58	2.15	0.00	0.00	4.68	6.38
9	2.25	2.68	1.15	1.38	0.00	0.00	3.40	4.05
10	1.72	1.69	.99	.97	0.00	0.00	2.70	2.66
11	2.61	2.31	1.75	1.55	0.00	0.00	4.35	3.86
12	2.59	1.34	2.49	1.30	0.00	0.00	5.08	2.64

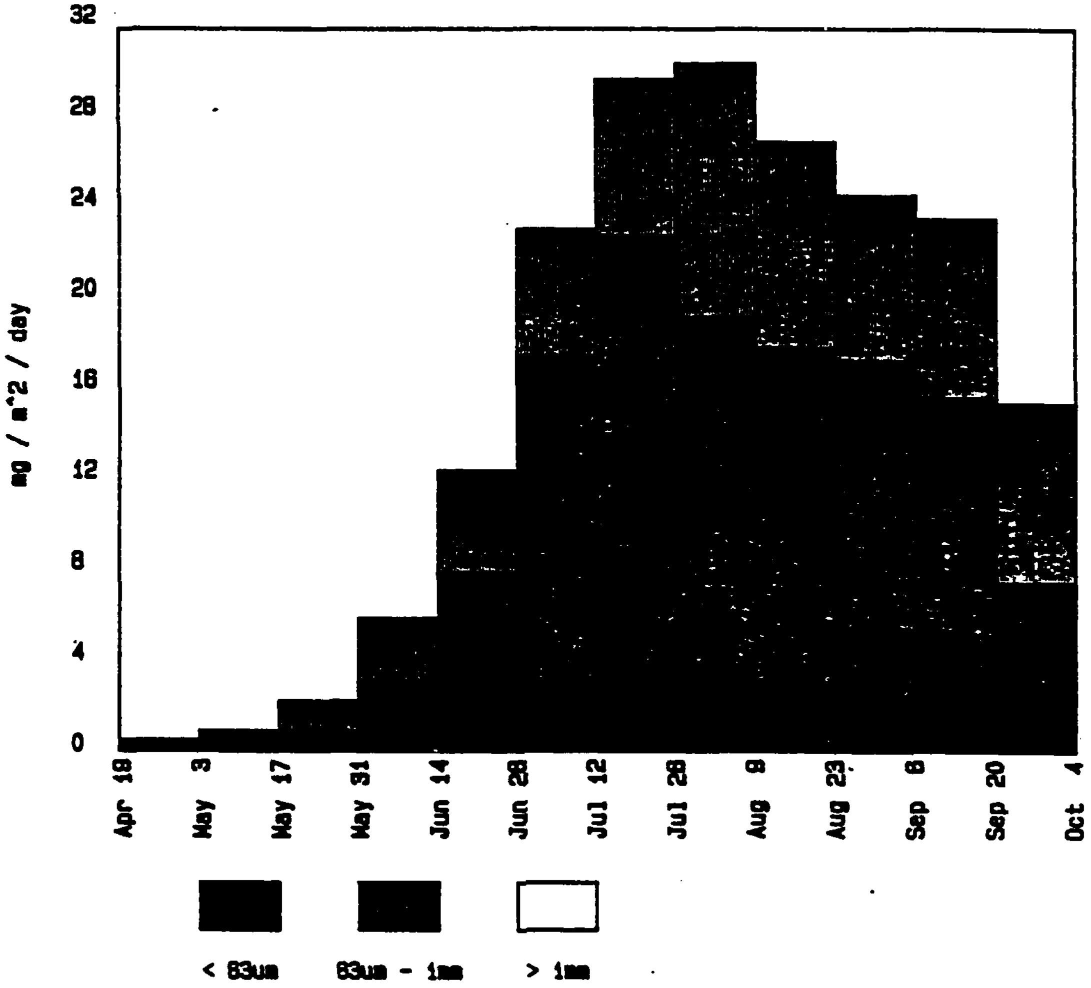
BLACK SEA 4 LITHOGENIC FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
LITHOGENIC Flux
Ttl is Total Flux in all size classes.

Cup #	< 63um % of Ttl	FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1	14.48	.84	30.98	1.81	0.00	0.00	45.46	2.65
2	53.89	7.49	4.11	.57	0.00	0.00	58.00	8.06
3	24.46	8.42	17.45	6.01	0.00	0.00	41.91	14.42
4	24.06	10.64	16.51	7.30	0.00	0.00	40.57	17.93
5	24.21	20.31	10.41	8.73	0.00	0.00	34.62	29.04
6	18.02	22.15	5.58	6.86	0.00	0.00	23.60	29.01
7	18.60	24.40	3.75	4.92	0.00	0.00	22.35	29.32
8	19.70	26.83	13.67	18.61	0.00	0.00	33.37	45.44
9	16.95	20.21	6.80	8.11	0.00	0.00	23.75	28.32
10	15.22	14.97	3.87	3.81	0.00	0.00	19.09	18.78
11	13.06	11.57	3.37	2.99	0.00	0.00	16.43	14.55
12	7.88	4.10	5.25	2.73	0.00	0.00	13.13	6.83

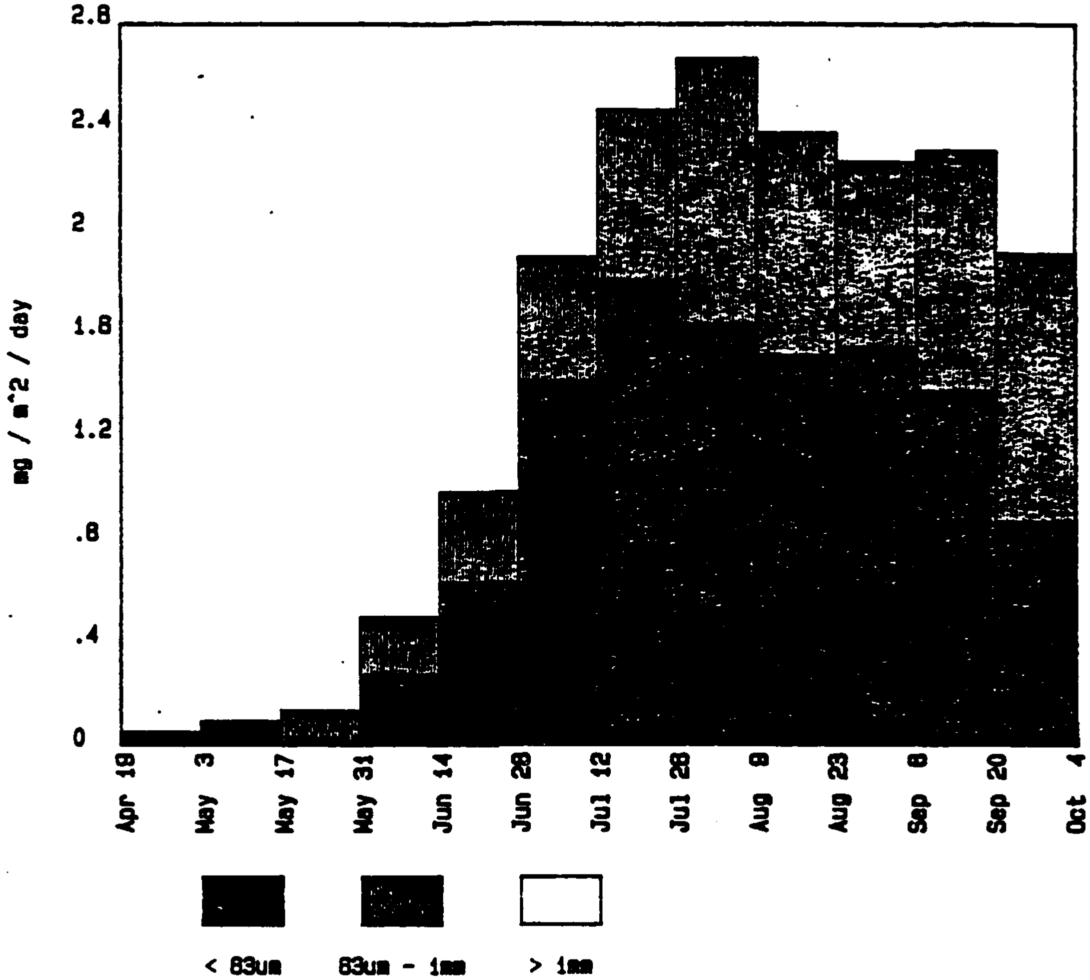
BLACK SEA 4 CARBON FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
CARBON FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

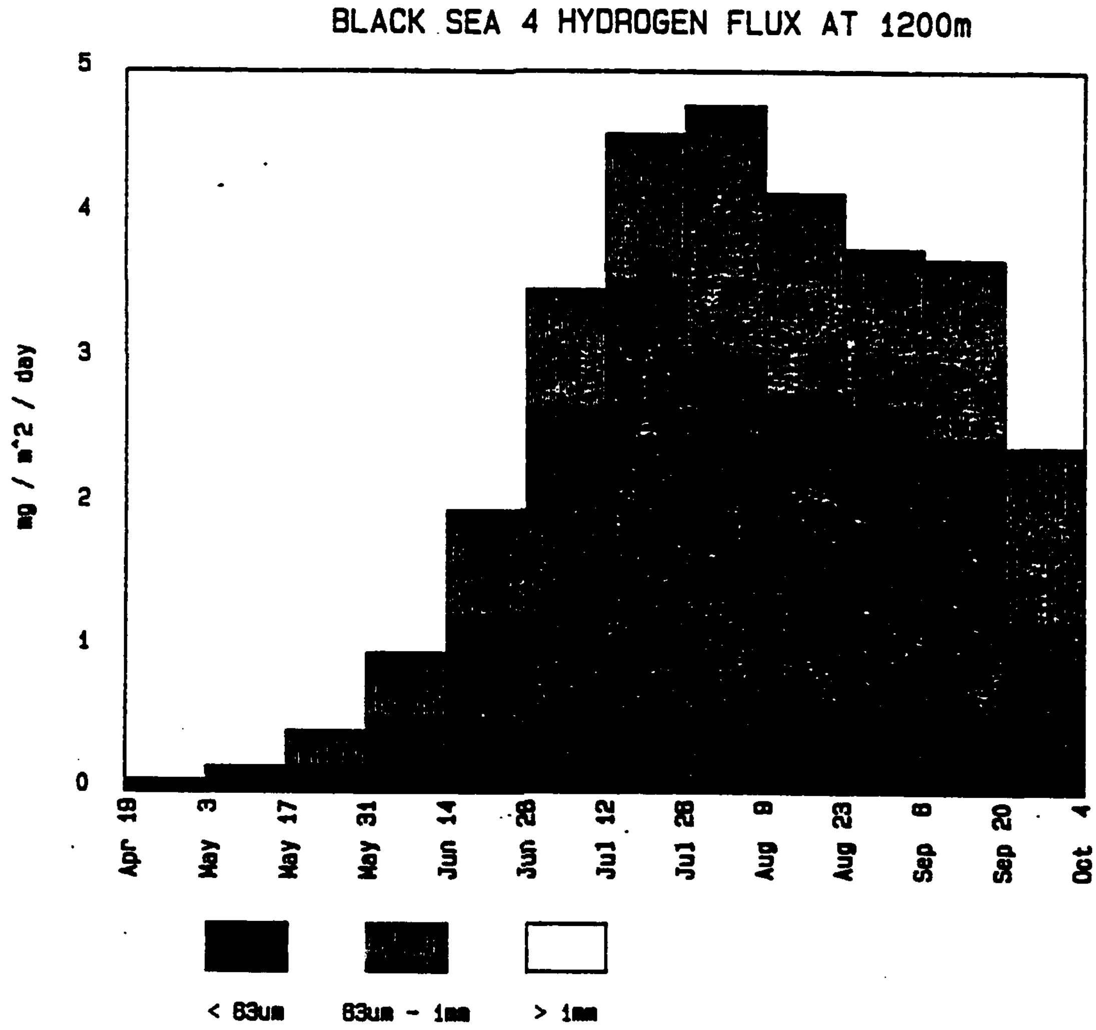
Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	4.13	.24	4.09	.24	0.00	0.00	8.22	.48
2	5.46	.76	.94	.13	0.00	0.00	6.39	.89
3	2.53	.87	3.90	1.34	0.00	0.00	6.43	2.21
4	6.97	3.08	6.31	2.79	0.00	0.00	13.27	5.87
5	9.44	7.92	5.40	4.53	0.00	0.00	14.84	12.45
6	14.29	17.56	4.60	5.65	0.00	0.00	18.88	23.21
7	17.47	22.92	5.32	6.97	0.00	0.00	22.79	29.90
8	14.15	19.27	8.32	11.33	0.00	0.00	22.47	30.60
9	15.03	17.92	7.71	9.20	0.00	0.00	22.74	27.12
10	17.65	17.36	7.49	7.36	0.00	0.00	25.14	24.72
11	17.72	15.70	9.01	7.98	0.00	0.00	26.73	23.68
12	14.33	7.45	15.38	7.99	0.00	0.00	29.71	15.44

BLACK SEA 4 NITROGEN FLUX AT 1200m



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
NITROGEN FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

Cup #	< 63um		63um - 1		> 1mm		TOTAL	
	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
1	.47	.03	.37	.02	0.00	0.00	.84	.05
2	.59	.08	.07	.01	0.00	0.00	.66	.09
3	.02	.01	.36	.12	0.00	0.00	.39	.13
4	.62	.27	.51	.23	0.00	0.00	1.13	.50
5	.76	.64	.43	.36	0.00	0.00	1.19	.99
6	1.16	1.43	.39	.49	0.00	0.00	1.56	1.92
7	1.39	1.82	.51	.67	0.00	0.00	1.90	2.49
8	1.21	1.65	.77	1.04	0.00	0.00	1.98	2.69
9	1.28	1.53	.73	.87	0.00	0.00	2.02	2.41
10	1.59	1.56	.74	.73	0.00	0.00	2.33	2.29
11	1.57	1.39	1.06	.94	0.00	0.00	2.63	2.33
12	1.69	.88	2.03	1.05	0.00	0.00	3.72	1.93



Black Sea 4
Mark 5 trap open from Apr 19 1984 to Oct 4 1984 at 1200 meters.
HYDROGEN FLUX (mg / m^2 / day)
Ttl is Total Flux in all size classes.

Cup #	< 63um % of Ttl	< 63um FLUX	63um - 1 % of Ttl	63um - 1 FLUX	> 1mm % of Ttl	> 1mm FLUX	TOTAL % of Ttl	TOTAL FLUX
1	.65	.04	.79	.05	0.00	0.00	1.44	.08
2	1.12	.16	.16	.02	0.00	0.00	1.28	.18
3	.55	.19	.70	.24	0.00	0.00	1.25	.43
4	1.20	.53	1.03	.45	0.00	0.00	2.23	.98
5	1.50	1.26	.89	.74	0.00	0.00	2.38	2.00
6	2.21	2.71	.68	.83	0.00	0.00	2.88	3.55
7	2.76	3.62	.78	1.02	0.00	0.00	3.53	4.64
8	2.26	3.08	1.29	1.75	0.00	0.00	3.55	4.83
9	2.36	2.81	1.18	1.41	0.00	0.00	3.54	4.22
10	2.78	2.73	1.12	1.10	0.00	0.00	3.90	3.83
11	2.83	2.50	1.42	1.26	0.00	0.00	4.24	3.76
12	2.32	1.20	2.38	1.24	0.00	0.00	4.70	2.44

Experiment BS-5

Flux at 278 m and 1,136 m deep

October 8, 1984

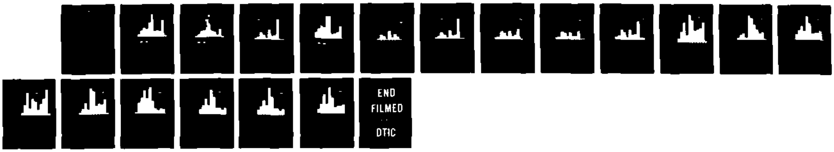
to

April 6, 1985

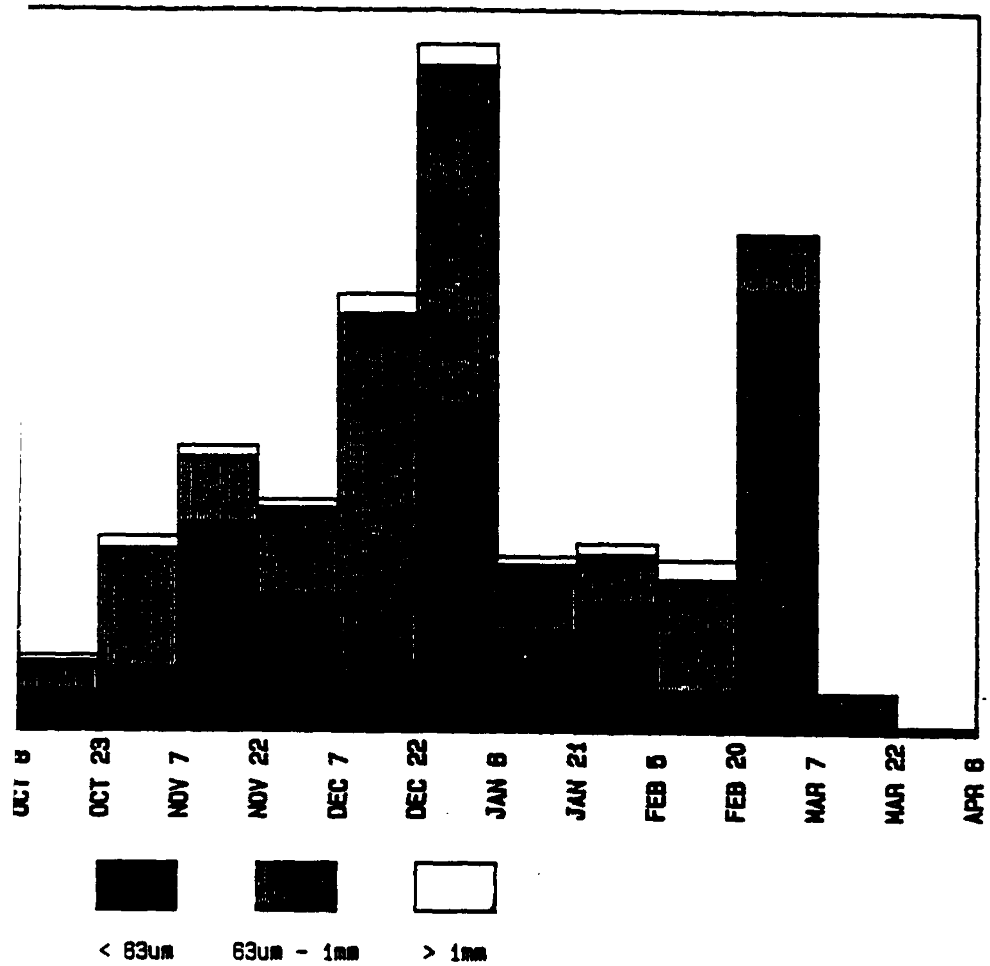
at

15 day intervals

AD-A268 547 PARTICLE FLUXES SOUTH CENTRAL BLACK SEA: 1982-1985 2/2
(BLACK SEA SEDIMENTATION DATA FILE VOLUME 1)(U) WOODS
HOLE OCEANOGRAPHIC INSTITUTION MA S HONJO ET AL.
UNCLASSIFIED MAY 87 WHOI-87-25 XJ-XD NSF-OC386-017106 NL



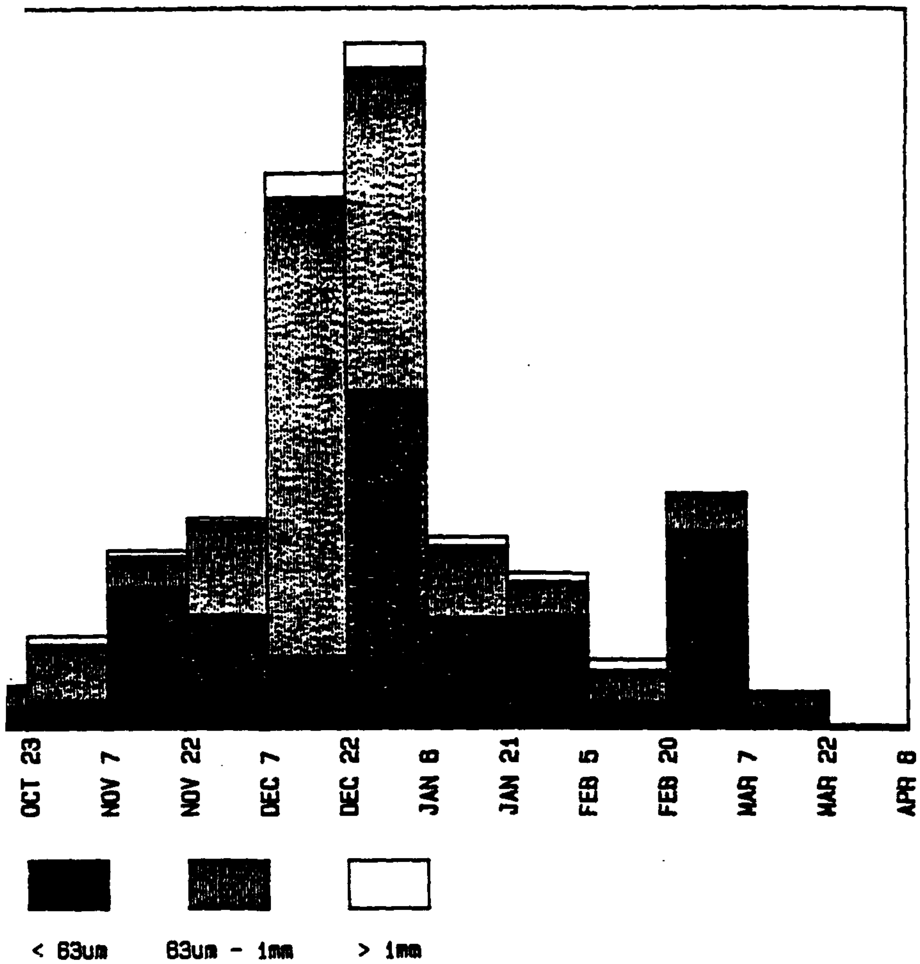
BLACK SEA 5 TOTAL FLUX AT 250m



TTLF <63	TTLF <63 % of tot.	TTLF 63-1	TTLF 63-1 % of tot.	TTLF >1	>1 % of total	TTLF total
16.41	52.86	12.41	39.97	2.23	7.17	31.05
25.98	32.36	49.46	61.61	4.84	6.03	80.28
86.12	73.15	27.41	23.28	4.20	3.57	117.74
56.42	58.99	35.92	37.56	3.30	3.45	95.63
21.27	11.76	151.52	83.78	8.07	4.46	180.86
135.40	47.69	139.76	49.23	8.74	3.08	283.90
41.56	57.59	27.28	37.80	3.33	4.61	72.16
53.67	68.91	19.78	25.39	4.38	5.63	77.89
216.06	79.99	45.96	17.02	8.09	3.00	270.12
16.15	56.49	11.59	40.54	0.85	2.97	28.59
9.13	55.61	6.24	38.01	1.05	6.38	16.42
1.40	58.31	1.00	41.69	0.00	0.00	2.41

mg/m^2/day

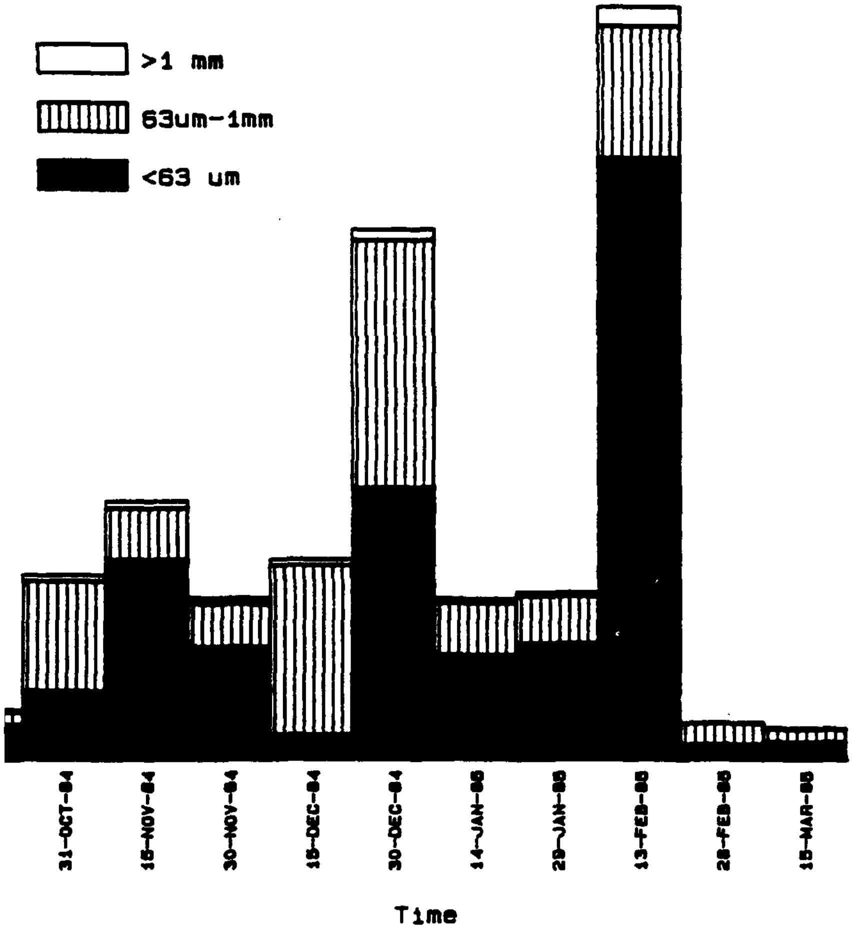
BLACK SEA 5 CARBONATE FLUX AT 250m



CRTA <63	CRTA % tot.<63	CRTA 63-1	CRTA % tot.63-1	CRTA >1	CRTA % tot.>1	CRTA total	CRTA % total
3.4	10.93	2.76	8.89	0.63	2.02	6.78	21.84
4.3	5.40	8.86	11.04	1.38	1.72	14.57	18.15
22.2	18.81	5.00	4.24	0.91	0.78	28.06	23.83
17.8	18.65	14.73	15.41	0.68	0.72	33.25	34.77
11.4	6.28	72.56	40.12	3.84	2.12	87.76	48.52
53.4	18.81	50.80	17.89	3.83	1.35	108.03	38.05
9.0	12.53	11.38	15.77	1.49	2.06	21.90	30.35
17.7	22.73	5.38	6.90	1.40	1.80	24.48	31.43
42.3	15.65	5.03	1.86	1.73	0.64	49.02	18.15
3.9	13.73	3.43	11.99	0.35	1.23	7.70	26.94
3.1	19.15	2.22	13.55	0.41	2.47	5.77	35.17
0.4	16.66					0.40	16.66

ssed in mg/m^2/day.

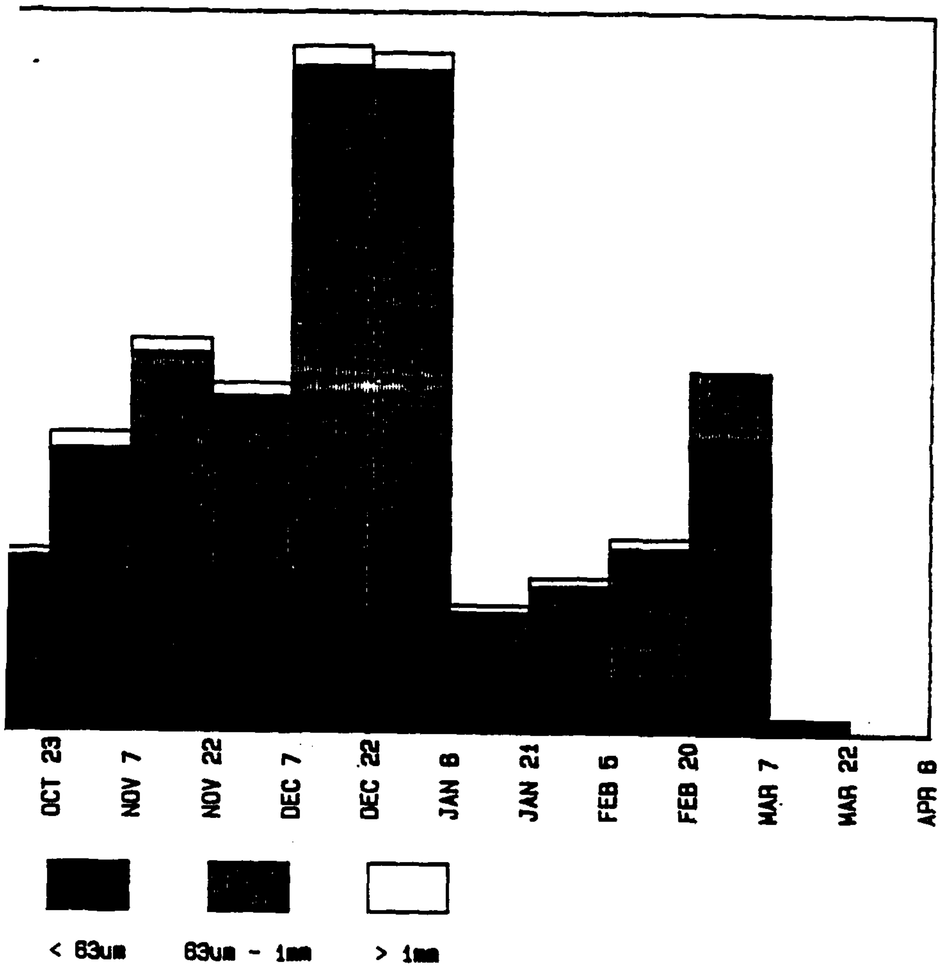
Noncombustible Flux at Black Sea 5, 250 m, 1984-85



NONC <63	NONC % tot.<63	NONC 63-1	NONC % %tot.63-1	NONC >1	NONC % tot.>1	NONC total	NONC % total
9.12	29.37	3.22	10.36	0.65	2.09	12.99	41.83
17.47	21.76	28.00	34.88	1.50	1.87	46.97	58.50
50.86	43.20	13.02	11.06	1.64	1.39	65.53	55.65
28.79	30.10	11.05	11.55	1.31	1.37	41.14	43.02
6.36	3.51	43.00	23.77	1.60	0.88	50.96	28.18
68.97	24.29	62.72	22.09	2.58	0.91	134.28	47.30
26.56	36.81	13.25	18.36	1.04	1.44	40.85	56.61
29.62	38.03	12.08	15.50	0.92	1.18	42.62	54.72
152.13	56.32	33.26	12.31	4.89	1.81	190.28	70.44
4.10	14.35	5.25	18.35	0.17	1.04	9.52	33.29
4.79	29.17	3.21	19.57	0.39	16.18	8.39	51.08

mg/m^2/day

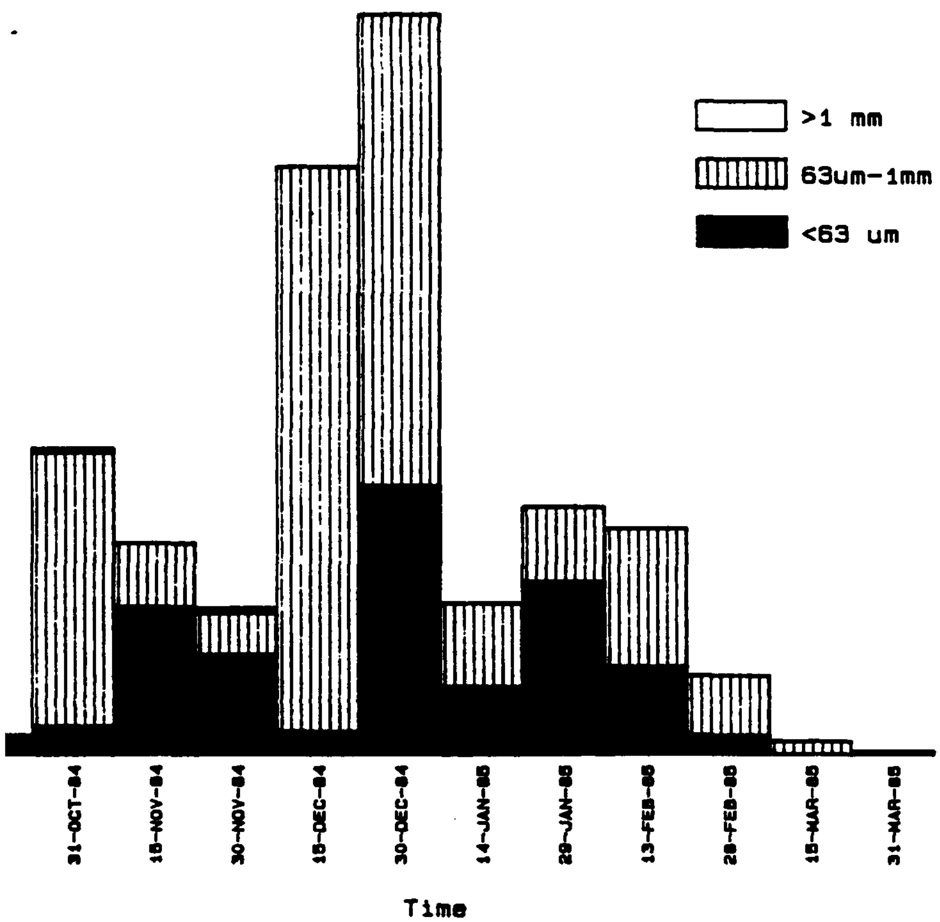
BLACK SEA 5 COMBUSTIBLE FLUX AT 250m



COMB <63	COMB % tot.<63	COMB 63-1	COMB % tot.63-1	COMB >1	COMB % tot.>1	COMB TOTAL	COMB % total
3.90	12.55	6.43	20.72	0.95	3.06	11.28	36.33
4.18	5.20	18.74	15.69	1.97	2.45	18.74	23.34
13.11	11.14	9.39	7.98	1.64	1.39	24.15	20.51
9.80	10.24	10.14	10.60	1.31	1.37	21.24	22.21
3.57	1.97	35.96	19.88	2.63	1.45	42.15	23.30
13.04	4.59	26.23	9.24	2.33	0.82	41.60	14.65
5.96	8.26	2.65	3.67	0.80	1.11	9.40	13.03
6.34	8.14	2.33	2.99	2.06	2.64	10.73	13.78
21.67	8.02	7.68	2.84	1.46	0.54	30.81	11.41
8.12	28.41	2.91	10.19	0.33	1.79	11.37	39.77
1.20	7.29	0.80	4.89	0.26	10.79	2.26	13.75

mg/m^2/day

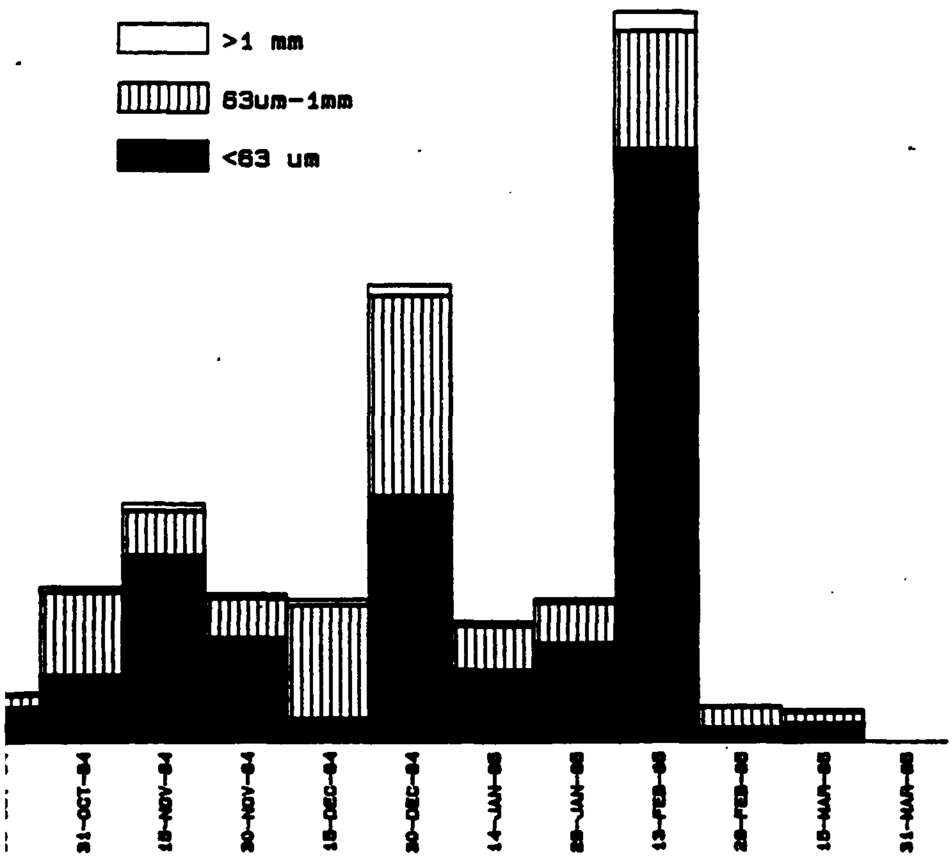
Biogenic Silica Flux at Black Sea 5, 250 m, 1984-85



OPAL <63	OPAL % Ncmb.<63	OPAL 63-1	OPAL % Ncmb.63-1	OPAL >1	OPAL % Ncmb.>1	OPAL total	OPALtot. %Ncmb.
0.43	3.31	0.00	0.00	0.05	0.39	0.49	3.77
0.72	1.53	6.95	14.80	0.12	0.26	7.79	16.59
3.74	5.71	1.62	2.47	0.00	0.00	5.36	8.18
2.54	6.17	1.06	2.58	0.11	0.27	3.71	9.02
0.58	1.14	14.34	28.14	0.00	0.00	14.91	29.26
6.82	5.08	11.96	8.91	0.00	0.00	18.77	13.98
1.72	4.21	2.12	5.19	0.00	0.00	3.84	9.40
4.38	10.28	1.91	4.48	0.00	0.00	6.30	14.78
2.22	1.17	3.51	1.84	0.00	0.00	5.74	3.02
0.50	5.25	1.52	15.97	0.00	0.00	2.02	21.23
0.00	0.00	0.34	4.05	0.00	0.00	0.34	4.05
0.00		0.09		0.00		0.09	

mg/m^2/day.

Lithogenic Flux at Black Sea 5. 250 m. 1984-85

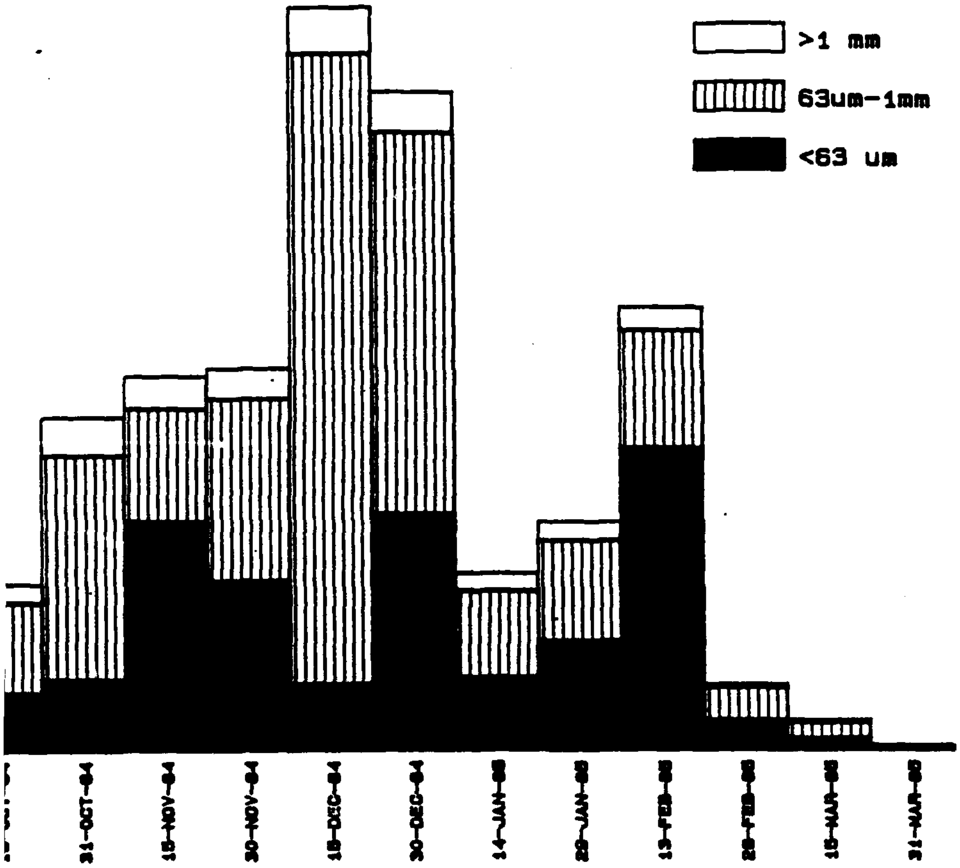


Time

LITH <63	LITH<63 %ncmb.	LITH 63-1	LITH63-1 %ncmb.	LITH >1	LITH>1 %ncmb.	LITH total	LITH %total
8.69	66.92	3.22	24.80	0.60	4.62	12.51	96.34
16.75	35.66	21.04	44.80	1.38	2.94	39.17	83.40
47.11	71.90	11.40	17.40	1.64	2.50	60.15	91.80
26.25	63.81	9.98	24.26	1.19	2.89	37.42	90.96
5.78	11.34	28.66	56.24	1.60	3.14	36.04	70.72
62.16	46.29	50.77	37.81	2.58	1.92	115.51	86.02
18.05	44.18	11.13	27.24	1.04	2.55	30.22	73.97
25.00	58.66	10.17	23.86	0.92	2.16	36.09	84.68
149.91	78.78	29.75	15.63	4.89	2.57	184.55	96.99
3.61	37.94	5.25	55.17	0.17	1.79	9.03	94.89
4.79	57.12	2.87	34.23	0.39	4.65	8.05	96.00
0.00							

/m^2/day.

Carbon Flux at Black Sea 5, 250 m, 1984-85

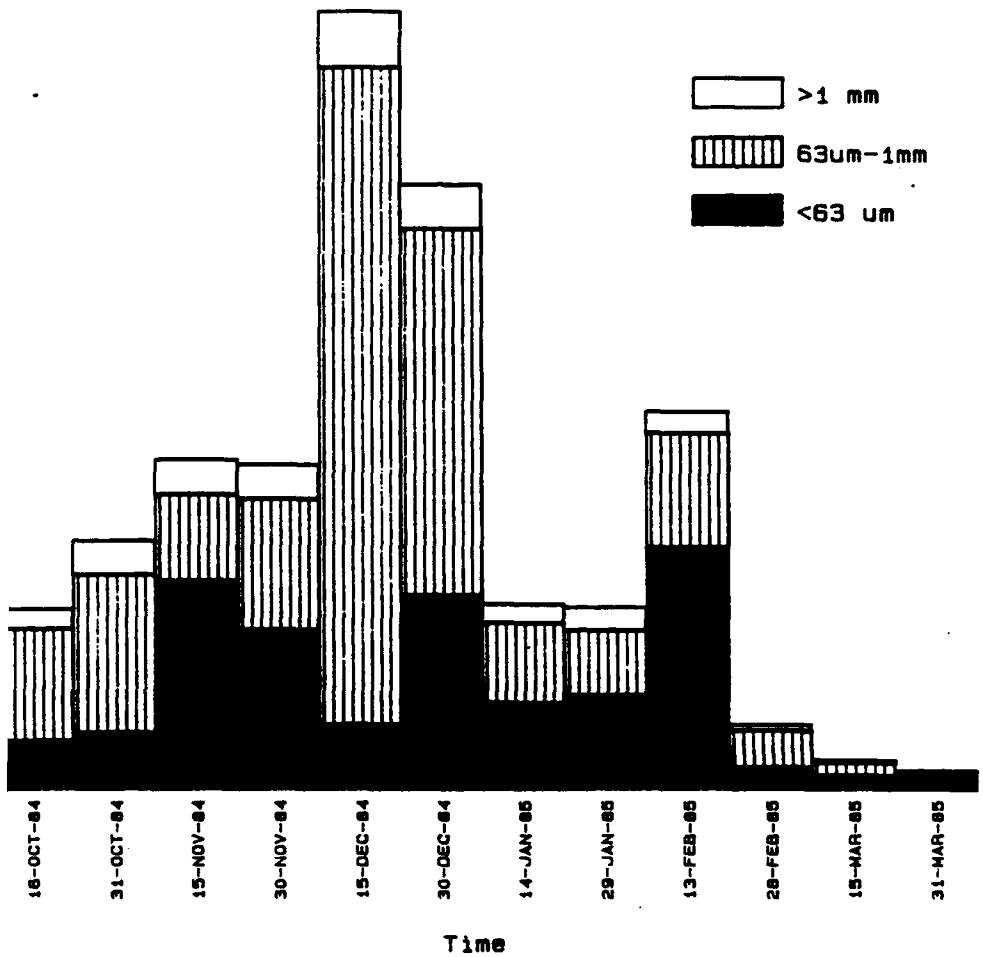


Time

250M 15 DAY OPENING
trap open from OCTOBER 8 1984 to APRIL 6 1985 at 250 meters.
(mg / m^2 / day)
l Flux in all size classes.

um FLUX	63um - 1 % of Ttl	FLUX	> 1mm % of Ttl	FLUX	TOTAL % of Ttl	FLUX
1.46	7.33	2.27	1.48	.46	13.51	4.19
1.80	7.03	5.65	1.21	.97	10.48	8.41
5.76	2.43	2.86	.69	.82	8.02	9.44
4.26	4.79	4.58	.82	.78	10.06	9.62
1.68	8.76	15.84	.39	.70	10.07	18.22
5.95	3.38	9.60	.36	1.03	5.84	16.57
1.84	3.01	2.17	.60	.43	6.16	4.45
2.73	3.24	2.52	.65	.50	7.39	5.75
7.60	1.10	2.96	.22	.59	4.13	11.15
.75	2.91	.83	.32	.09	5.87	1.68
.30	2.47	.41	.41	.07	4.72	.77
	0.00		0.00		4.84	

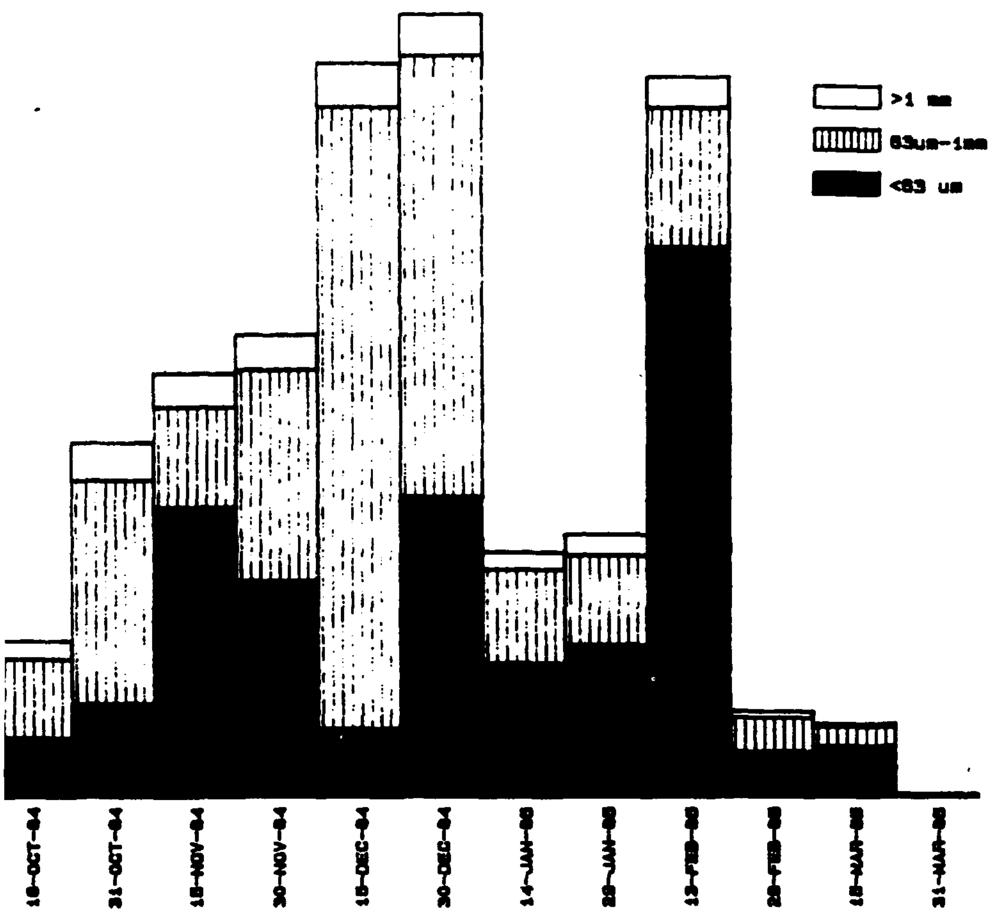
Nitrogen Flux at Black Sea 5. 250 m. 1984-85



5 250M 15 DAY OPENING
trap open from OCTOBER 8 1984 to APRIL 6 1985 at 250 meters.
LUX (mg / m^2 / day)
al Flux in all size classes.

3um	63um - 1		> 1mm		TOTAL	
FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
.16	1.19	.37	.22	.07	1.92	.60
.19	.65	.52	.14	.11	1.02	.82
.69	.24	.28	.10	.12	.93	1.09
.53	.45	.43	.12	.11	1.12	1.07
.22	1.20	2.16	.10	.18	1.42	2.56
.64	.43	1.21	.05	.15	.70	2.00
.21	.36	.26	.09	.06	.75	.54
.31	.27	.21	.10	.08	.77	.60
.80	.14	.38	.03	.07	.46	1.25
.08	.42	.12	.06	.02	.75	.21
.05	.25	.04	.05	.01	.61	.10
.00	0.00	0.00	0.00	0.00	.14	00

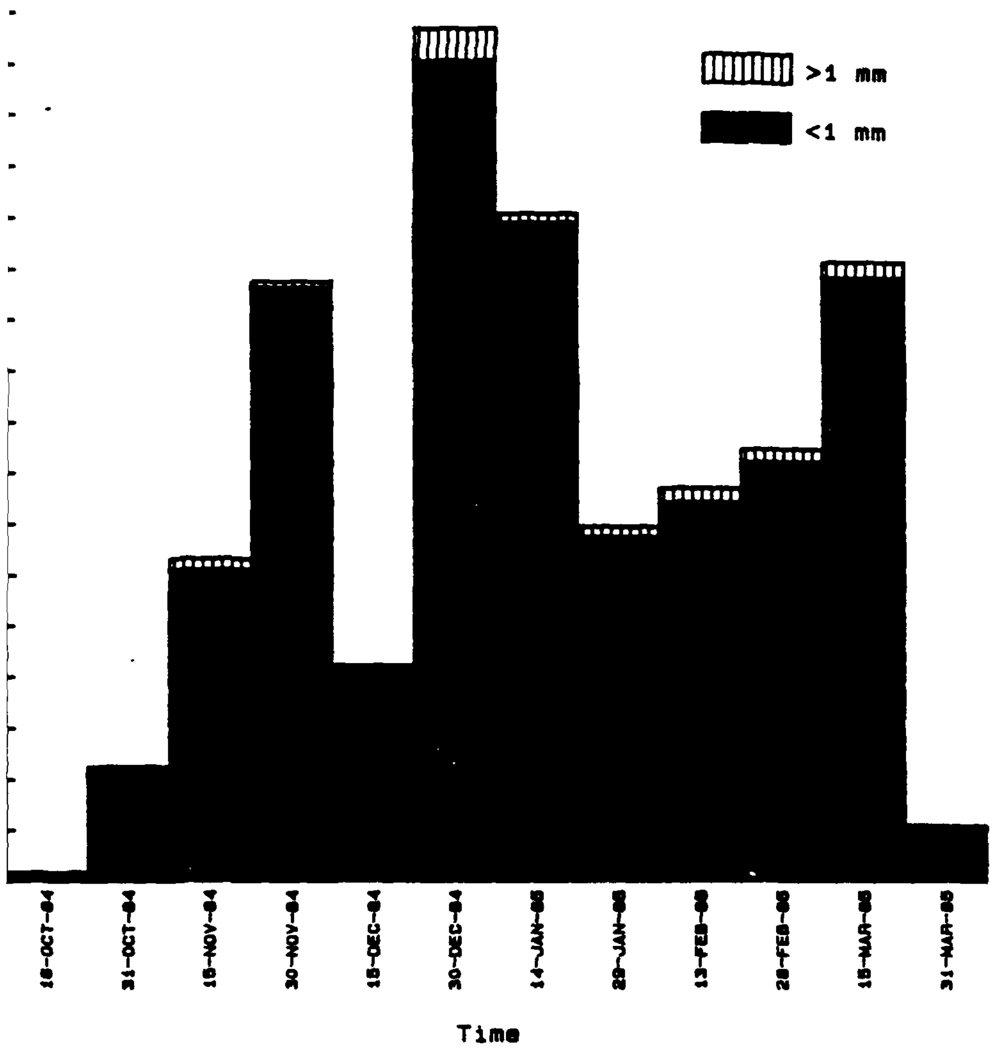
Hydrogen Flux at Black Sea 5, 250 m, 1984-85



; 250M 15 DAY OPENING
trap open from OCTOBER 8 1984 to APRIL 6 1985 at 250 meters.
.UX (mg / m^2 / day)
l Flux in all size classes.

um	63um - 1		> 1mm		TOTAL	
FLUX	% of Ttl	FLUX	% of Ttl	FLUX	% of Ttl	FLUX
.22	.96	.30	.23	.07	1.92	.59
.35	1.06	.85	.18	.15	1.68	1.35
1.10	.32	.38	.11	.13	1.37	1.61
.82	.84	.80	.14	.13	1.83	1.75
.26	1.31	2.36	.09	.17	1.54	2.78
1.14	.59	1.67	.06	.16	1.05	2.97
.38	.49	.36	.10	.07	1.11	.80
.58	.44	.34	.10	.08	1.28	1.00
2.09	.20	.53	.04	.12	1.01	2.73
.17	.45	.13	.09	.03	1.14	.33
.19	.45	.07	.08	.01	1.70	.28
	0.00		0.00		.53	

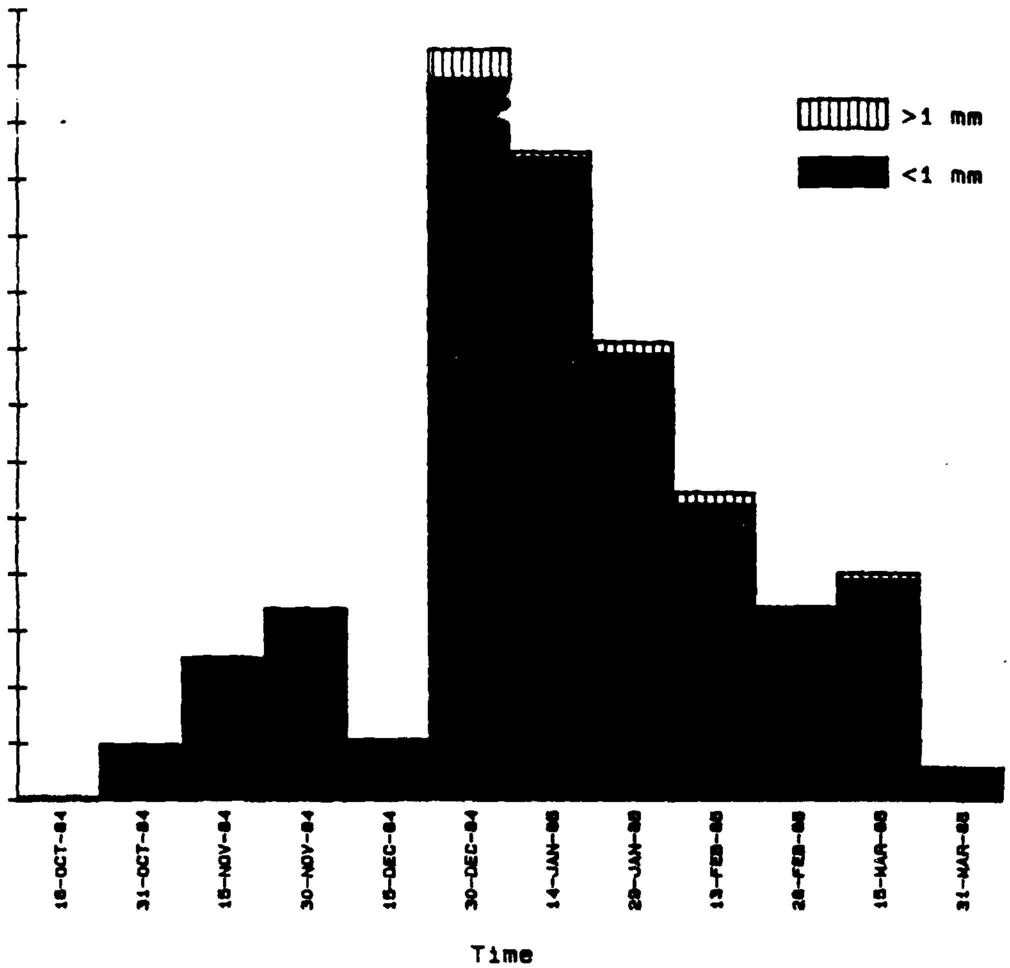
Total Flux at Black Sea 5, 1200 m, 1984-85



200-1	TTLF <1	<1 % of total	TTLF >1	>1 % of total	TTLF total
200-1	3.81	100.00		0.00	3.81
200-2	44.44	99.33	0.30	0.67	44.74
200-3	121.97	96.53	4.39	3.47	126.36
200-4	232.21	99.05	2.23	0.95	234.45
200-5	83.67	99.11	0.75	0.89	84.42
200-6	320.80	96.21	12.65	3.79	333.45
200-7	257.49	98.66	3.49	1.34	260.98
200-8	134.72	97.08	4.05	2.92	138.77
200-9	148.42	96.46	5.45	3.54	153.87
200-10	164.22	97.06	4.98	2.94	169.20
200-11	236.14	97.44	6.19	2.56	242.34
200-12	20.71	95.10	1.07	4.90	21.78

is in mg/m^2/day

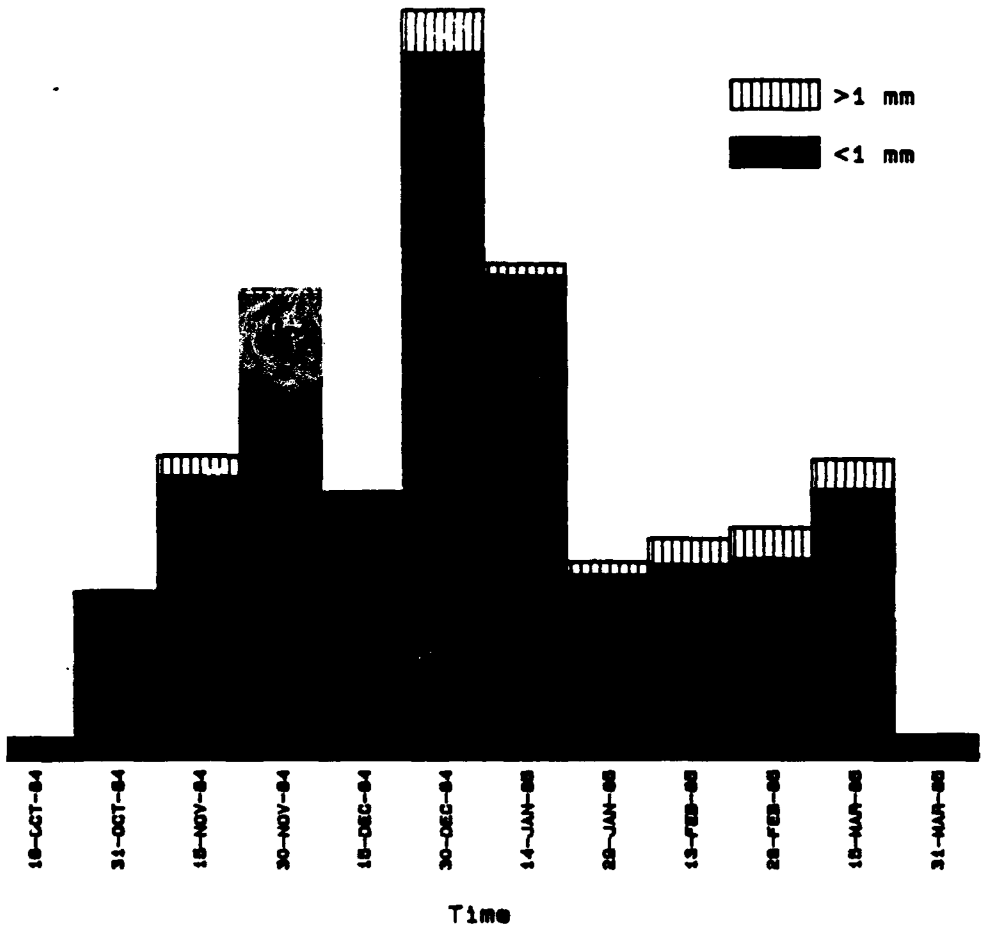
Carbonate Flux at Black Sea 5, 1200 m, 1984-85



	CRTA <1	CRTA % tot.<1	CRTA >1	CRTA % tot.>1	CRTA total	CRTA % total
00-1	0.56	14.72			0.56	14.72
00-2	9.61	21.47	0.07	0.16	9.68	21.64
00-3	24.55	19.43	0.69	0.55	25.25	19.98
00-4	33.58	14.32	0.34	0.14	33.92	14.47
00-5	10.58	12.54	0.18	0.22	10.77	12.75
00-6	127.78	38.32	5.24	1.57	133.02	39.89
00-7	113.94	43.66	1.10	0.42	115.04	44.08
00-8	79.15	57.04	2.06	1.48	81.21	58.52
00-9	52.65	34.21	2.12	1.38	54.76	35.59
00-10	33.44	19.76	0.93	0.55	34.37	20.31
00-11	39.11	16.14	1.16	0.48	40.27	16.62
00-12	5.60	25.70	0.32	1.46	5.92	27.16

s expressed in mg/m^2/day.

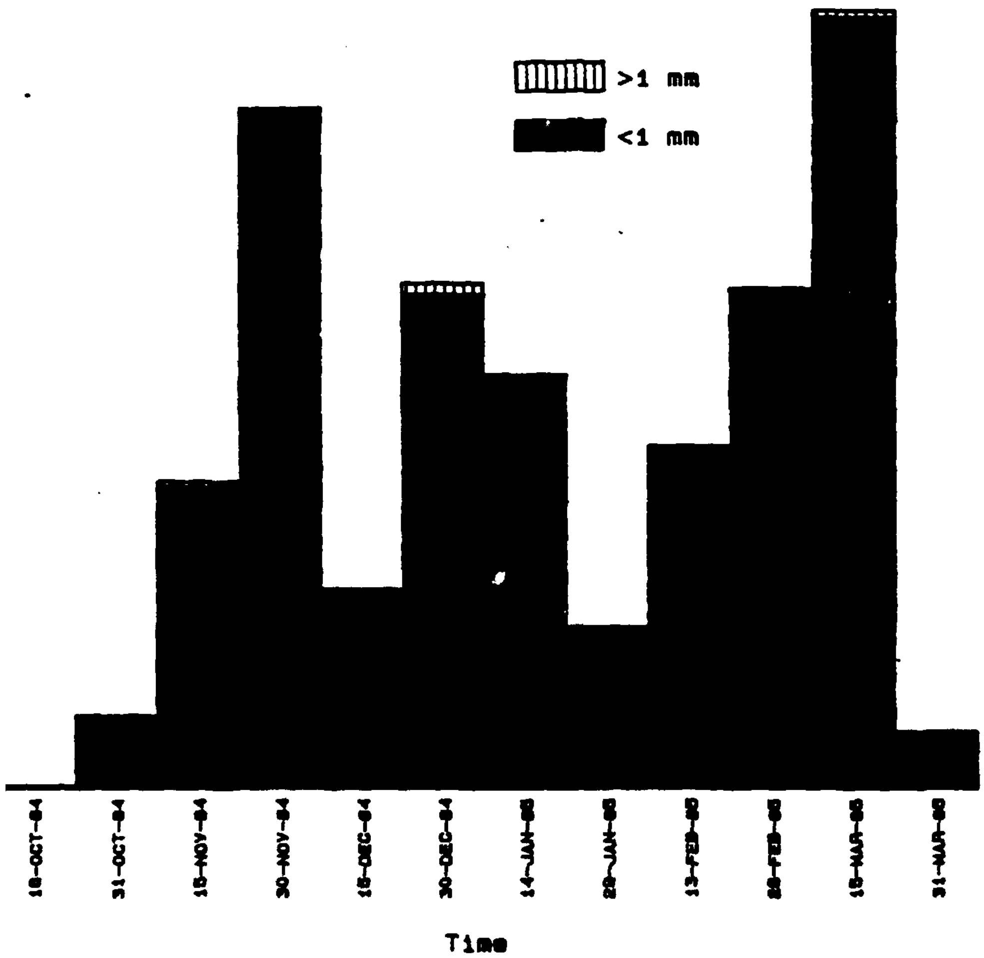
Noncombustible Flux at Black Sea 5, 1200 m, 1984-85



le	NONC <1	NONC % tot.<1	NONC >1	NONC % tot.>1	NONC total	NONC % total
1200-1	2.44	63.94			2.44	63.94
1200-2	19.11	42.71	0.13	0.29	19.24	43.00
1200-3	32.32	25.58	2.46	1.95	34.78	27.53
1200-4	53.10	22.65	0.78	0.33	53.10	22.65
1200-5	30.23	35.81	0.33	0.39	30.56	36.20
1200-6	80.72	24.21	4.88	1.46	85.60	25.67
1200-7	55.30	21.19	1.44	0.55	56.74	21.74
1200-8	20.99	15.13	1.58	1.14	22.57	16.27
1200-9	22.16	14.40	3.02	1.96	25.18	16.36
1200-10	22.82	13.49	3.65	2.16	26.47	15.65
1200-11	30.86	12.73	3.61	1.49	34.67	14.22
1200-12	2.80	12.83			2.79	12.83

is in mg/m^2/day.

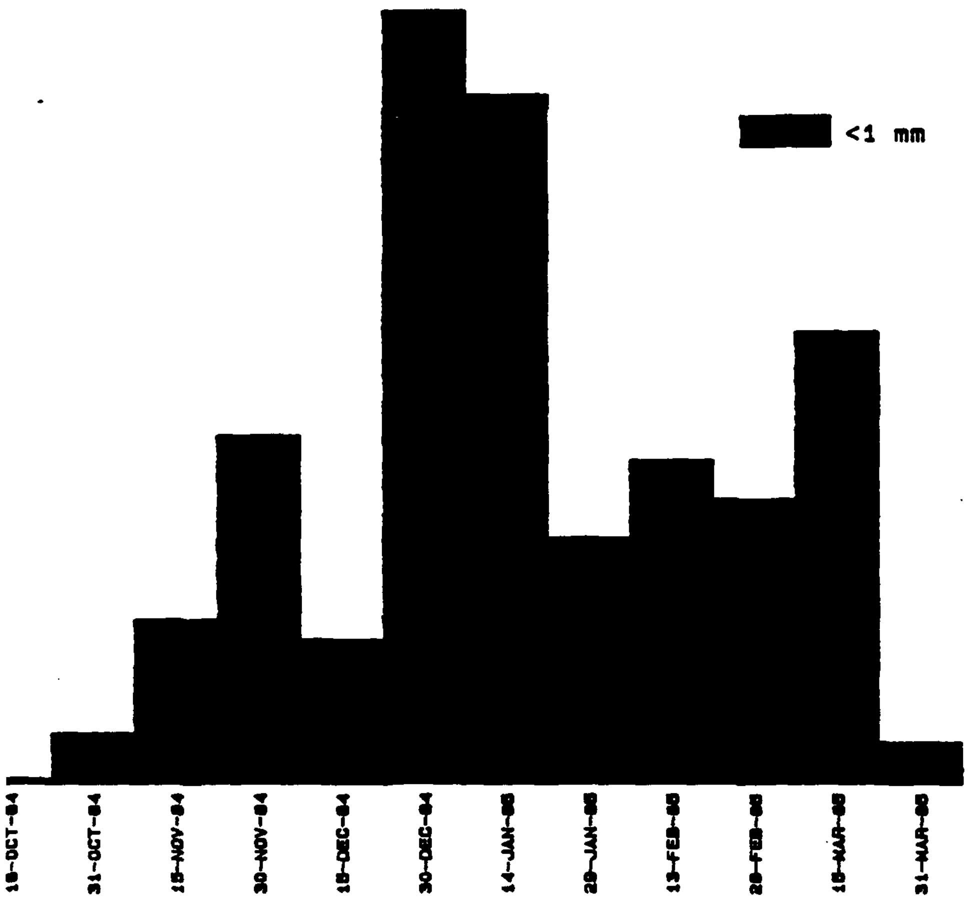
Combustible Flux at Black Sea 5, 1200 m, 1984-85



	COMB <1	COMB % tot.<1	COMB >1	COMB % tot.>1	COMB TOTAL	COMB % total
-1	0.51	21.26			0.81	21.26
-2	15.72	35.13	0.10	0.22	15.82	35.35
-3	65.09	51.51	1.23	0.97	66.32	52.48
-4	145.54	62.08	1.11	0.47	143.64	62.55
-5	42.86	50.77	0.23	0.27	43.08	51.03
-6	106.51	16.55	2.52	0.76	109.03	32.70
-7	88.25	33.82	0.95	0.36	88.80	34.03
-8	34.58	24.92	0.41	0.30	34.99	25.21
-9	73.61	47.84	0.31	0.20	73.92	48.04
-10	107.58	63.58	0.41	0.24	107.99	63.82
-11	166.18	68.57	1.42	0.59	167.60	69.16
-12	12.32	56.58			12.32	56.58

in mg/m^2/day.

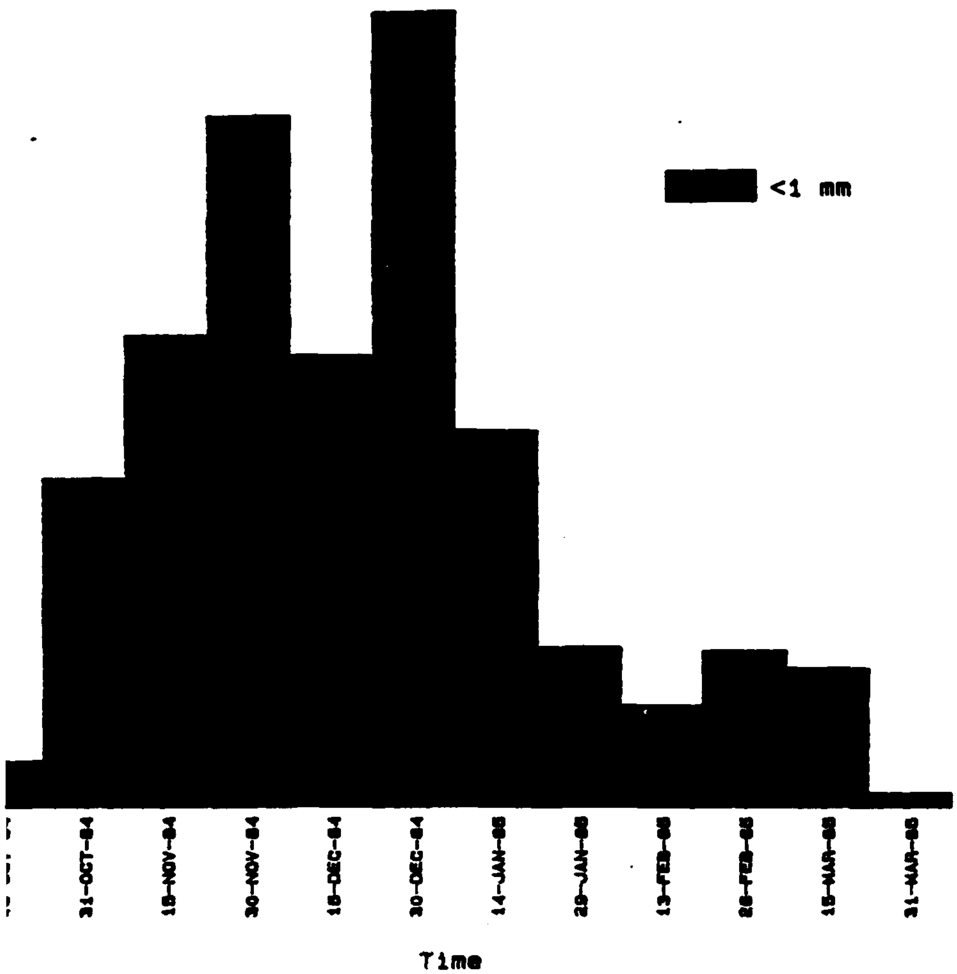
Biogenic Silica Flux at Black Sea 5, 1200 m, 1984-85



ie	OPAL <1	OPAL % Ncbm.<1	OPAL % TTLF <1
1200-1	0.21		5.59
1200-2	2.62	13.63	5.85
1200-3	8.61	25.64	6.81
1200-4	18.35	33.86	7.83
1200-5	7.55	24.77	8.94
1200-6	40.75	48.95	12.22
1200-7	36.38	64.68	13.94
1200-8	12.98	60.67	9.36
1200-9	17.11	76.16	11.12
1200-10	15.02	64.66	8.88
1200-11	23.90	74.06	9.86
1200-12	2.15		9.87

is in mg/m^2/day.
<1 mm fraction analyzed.

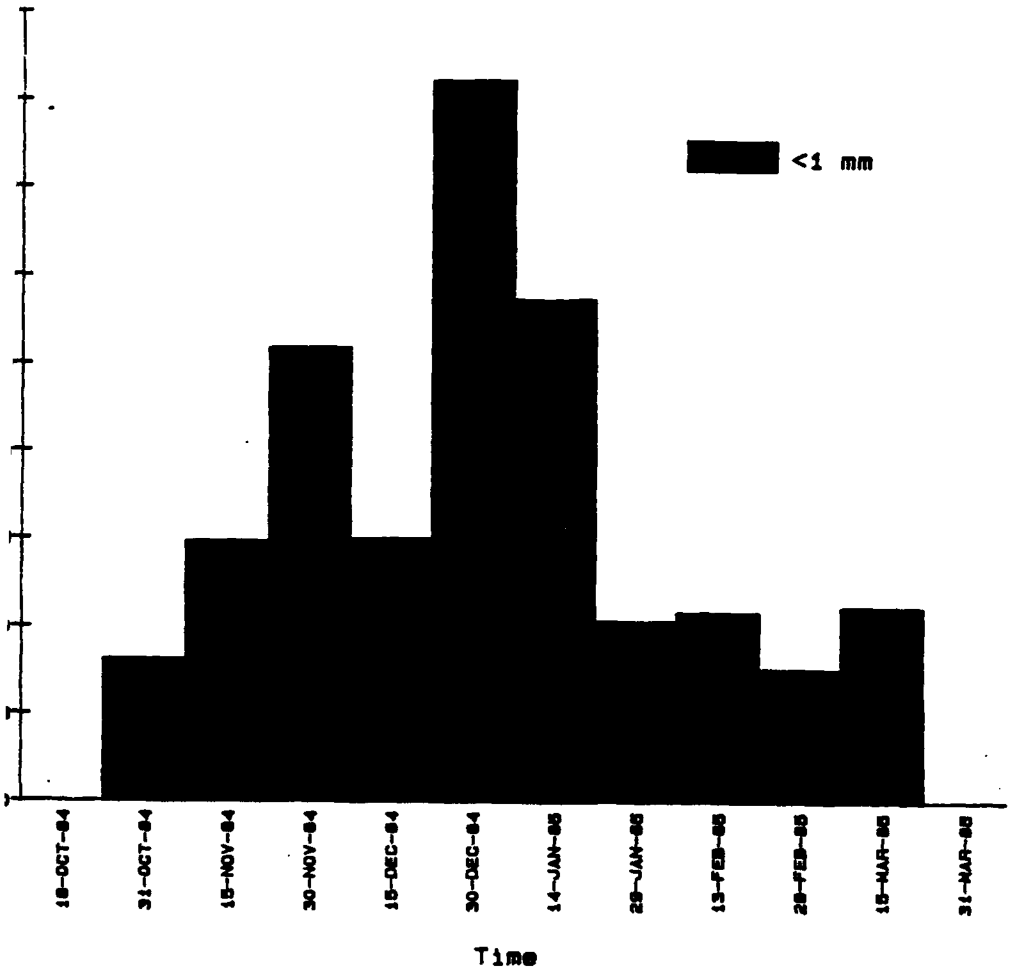
Lithogenic Flux at Black Sea 5, 1200 m, 1984-85



	LITH <1	LITH % Ncmb.<1	LITH % total<1
1	2.23		58.43
2	16.49	85.84	36.86
3	23.73	70.68	18.78
4	34.74	64.09	14.82
5	22.68	74.45	26.87
6	39.97	48.02	11.99
7	18.92	33.64	7.25
8	8.00	37.40	5.77
9	5.05	22.47	3.28
0	7.80	33.60	4.61
1	6.35	21.54	2.87
2	0.64		2.96

mg/m^2/day.
fraction analyzed.

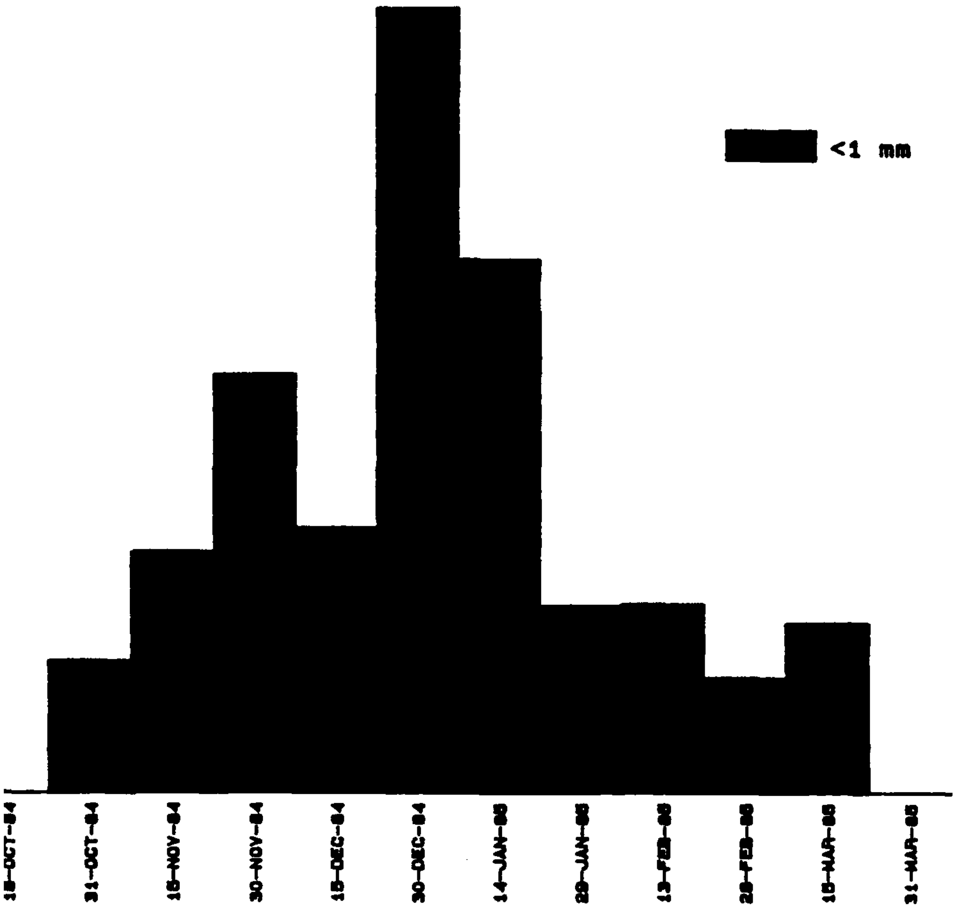
Carbon Flux at Black Sea 5. 1200 m. 1984-85



Sample ID#	CRNC <1	CRNC<1 %Cmbf.
BS5-1200-1		
BS5-1200-2	8.06	50.97
BS5-1200-3	14.82	22.34
BS5-1200-4	25.86	18.01
BS5-1200-5	14.94	34.68
BS5-1200-6	41.13	37.73
BS5-1200-7	28.64	32.25
BS5-1200-8	10.27	29.35
BS5-1200-9	10.80	14.62
BS5-1200-10	7.56	7.00
BS5-1200-11	11.11	6.63
BS5-1200-12		

Only enough material to analyze <1 fraction.
Flux is in mg/m^2/day.

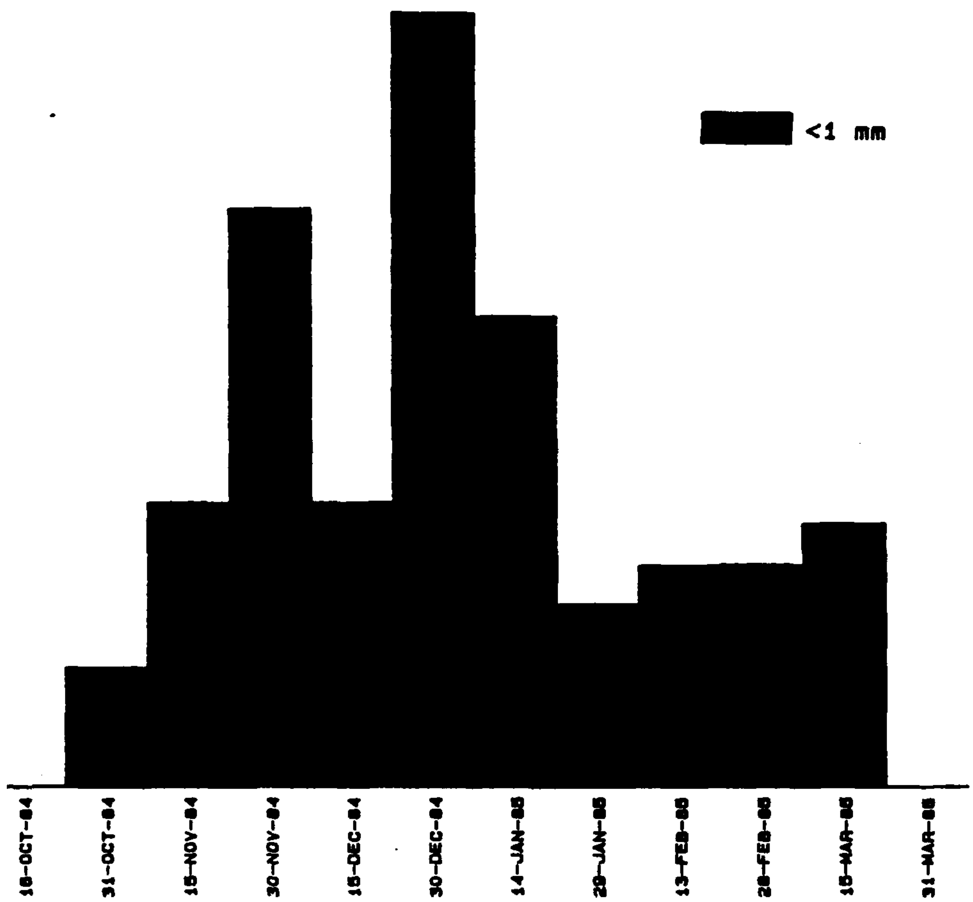
Nitrogen Flux at Black Sea 5. 1200 m. 1984-85



ample D#	NTGN <1	NTGN<1 %Cmbf.
S5-1200-1		
S5-1200-2	0.92	5.81
S5-1200-3	1.68	2.53
S5-1200-4	2.92	2.03
S5-1200-5	1.84	4.28
S5-1200-6	5.46	5.01
S5-1200-7	3.72	4.19
S5-1200-8	1.30	3.72
S5-1200-9	1.31	1.78
S5-1200-10	0.80	0.74
S5-1200-11	1.18	0.71
S5-1200-12		

nly enough material to analyze <1 fraction.
lux is in mg/m^2/day.

Hydrogen Flux at Black Sea 5. 1200 m. 1984-85



ale	HDGN <1	HDGN<1 %Cmbf.
-1200-1		
-1200-2	0.98	6.16
-1200-3	2.34	3.53
-1200-4	4.77	3.32
-1200-5	2.34	5.43
-1200-6	6.37	5.84
-1200-7	3.88	4.36
-1200-8	1.50	4.29
-1200-9	1.82	2.46
-1200-10	1.83	1.70
-1200-11	2.17	1.29
-1200-12		

, enough material to analyze <1 fraction.
(is in mg/m^2/day.